American Aviation

SEPTEMBER 26, 1955

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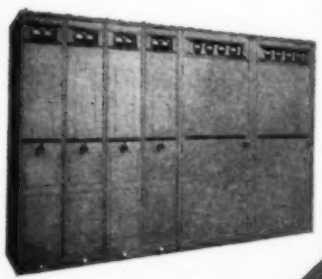

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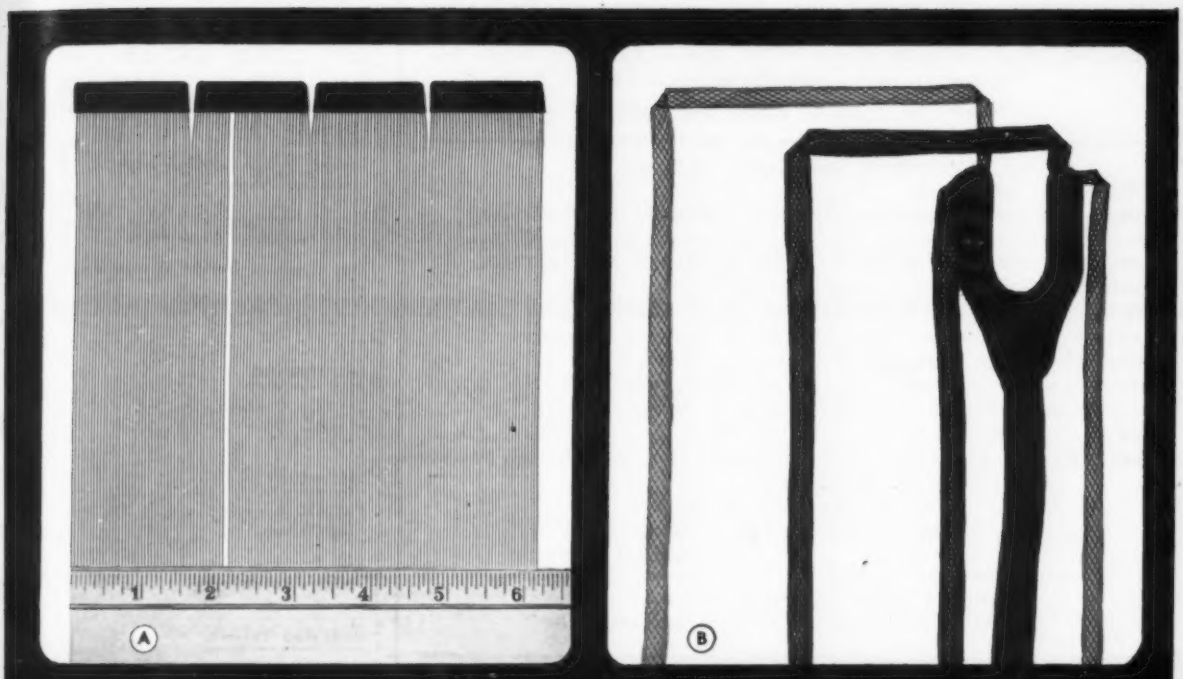

X-RAY VIEWS OF (A) Goodyear Electrothermal System employing embedded resistance wires woven in thin rubber-coated fabric, and (B) Braided leads supplying power to an embedded ply of Goodyear Conductive Rubber.

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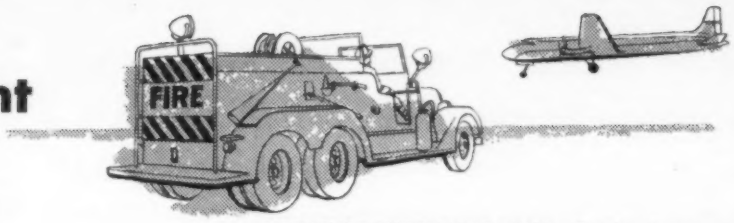
5 ways fire-resistant SKYDROL lowers cost of airline safety



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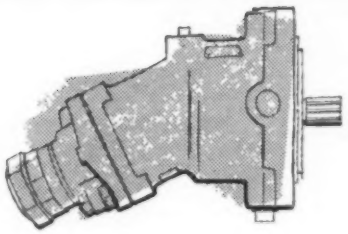
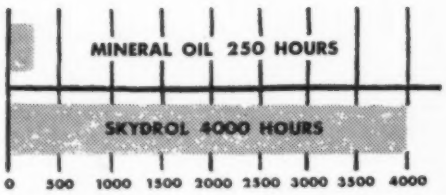


2

LENGTHENS PUMP LIFE—Superior lubricity of Skydrol reduces wear on moving parts, lengthens service life of pumps up to 34%, cuts component overhaul costs up to 20%.



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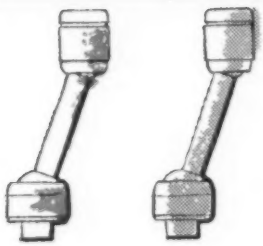
LONG SERVICE LIFE — Actual use in the Douglas supercharger shows excellent chemical and thermal stability stretches Skydrol fluid service life up to 16 times that of conventional hydraulic oil.



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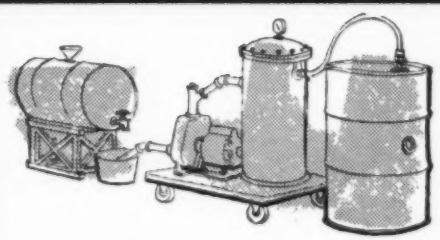
WON'T CORRODE METAL—Skydrol protects metal and alloy parts from corrosion and oxidation.



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Industry News Digest

Titanium Supply Ample, But Aluminum Shortage Exists, Says ODM Chief

Defense and aviation industries now seem assured of adequate supplies of basic titanium as a result of the announcement that the Government has gone "over the top" in its program to encourage the setting up of titanium producing and refining facilities.

Calling a halt recently to the two-year program, Defense Mobilization Director Arthur S. Flemming said that contracts now in force will provide for more titanium than is likely to be needed for the next two years.

Flemming took the step following a report by his special consultant, Studebaker-Packard executive Harold S. Vance, and discussions with the Defense Mobilization Board, its Titanium Advisory Committee and the National Academy of Sciences.

The ODM statement said that contracts in effect will be carried out. However, a proposed $40,000,000 plant, to have been built by E. I. duPont de Nemours & Co. has been knocked out, at least temporarily, by the decision.

• **Meanwhile, Flemming noted** that there is a serious shortage of aluminum available for industrial use in the U.S. As a result, he has called on the three domestic primary aluminum producers for delivery of 25,000 tons of the metal during the fourth quarter of 1955.

Delivery of a balance of 75,000 tons of aluminum to the national stockpile will be delayed because of the industrial pinch. All told, 350 million pounds of aluminum already have been made available to industrial users thus far this year to avoid serious dislocations.

Decision to defer fourth quarter stockpile calls to aid the industrial economy was made after a review of recommendations submitted by Secretary of Commerce Sinclair Weeks.

• **The ODM said** that of the 27,500 tons of titanium expected by 1957, a total of 21,600 tons will be produced under contract. This production thus exceeds comfortably the admittedly high 25,000-ton goal set in August, 1953. ODM pointed out that under a separate older contract duPont is to deliver 2,700 tons besides producing another 900 tons not under contract.

Four other companies holding General Services Administration contracts and the tonnages bought are: Titanium Metals Corporation of America, 3,600; Cramet, Inc. 6,000; Union Carbon & Carbide Corp., 7,500; and Dow Chemical Co., 1,800.

• **From the spring of 1954** onward the government had been encouraging the development of raw metal capacity with contracts to purchase "sponge" the basic raw metal, advances for building plants and fast tax writeoffs. Last month Flemming suspended further tax writeoffs as part of the general suspension of most fast tax writeoff categories. The current decision, therefore, adds to the general suspension order by forbidding the advance of government funds to build facilities and to purchase sponge.

The Vance report noted that titanium output in 1954 was roughly 5,000 tons, and that it is estimated at about 8,000 tons in 1955, 15,000 tons in 1956, and 22,500 tons in 1957. Use of titanium in 1954, Vance said, was about 32% of production and is estimated to be about the same percentage in the 1955-57 period.

Flemming has pointed out, however, that wider use of titanium has been delayed by melting and fabricating problems but said that the solution of them "is not too far distant."

• **Meanwhile, a possibly major** development in fabrication of titanium was disclosed by N. E. Promisel, the Navy's Bureau of Aeronautics chief metallurgist and head of its materials branch. He told a jointly sponsored meeting of New York University's College of Engineering and the American Society of Metals recently that the Department of Defense in the next few months is initiating an extensive titanium sheet rolling program.

Promisel said the government milling program "is aimed to bring promising new alloys to industry users in the shortest possible time."

The BuAer metallurgist predicted that the rolling program, combined with the elimination of certain technical problems and reduction in cost, could lift titanium "to the position of a big metal industry." He said "a price of $1 to $1.50 a pound is not unreasonable to anticipate, though no one expects this reduction within the next few years." A pound of titanium sponge now costs from $3.50 to $3.95 to produce.

Titanium's major applications, now and in the near future, lie in military aircraft, Promisel said. The potentialities of the metal in guided missiles are becoming evident, he added.

OFFICIAL ENTRY OF GENERAL MOTORS into the commercial turboprop engine field was signalled last week as American Airlines' president C. R. Smith (right) signed a $12.5-million order for Allison 501 engines to power its forthcoming fleet of Lockheed Electras. Confirmation of the 501 as powerplant for the Electra followed by more than three months AA's $65-million purchase of 35 Lockheed turboprops for first service in August 1958. Shown with Smith is C. R. Osborn, General Motors vice president.

New Feeder Mail Rate Proposed by CAB

A new multi-element service mail rate for local service airlines, patterned after that recently adopted for domestic trunk carriers, has been proposed by CAB.

Board estimates the new dual rate

will yield an average 104.78¢ per mail ton mile for the feeder carriers compared to a current average of 135.27¢.

Annual total service pay under the new structure will be about $883,000 versus $1,140,000 under existing rates. New rates will be computed on the basis of a standard line-haul charge of 30.17¢ per ton mile carried, plus a terminal charge per pound varying with the station served.

These terminal charges will be 3.32¢ per pound for Class A stations, 6.64¢ for Class B, 9.96¢ for class C, and 33.21¢ for Class D.

Revised rates will cover mail carried retroactive to July 1. Board member Josh Lee is preparing a separate statement on the subject to be released at a later date.

Carriers Fight UAL Plane-Auto Package

American Airlines and Eastern Air Lines have filed formal protests with CAB asking suspension and investigation of United Air Lines' newly proposed plane-auto excursion fares.

United's tariff, which covers reduced "package" rates between designated pairs of points for plane and car rental service, is due to become effective October 1.

AA charged the plan is "clearly unlawful" and that in some cases a passenger would have to pay more for an ordinary round-trip ticket than for the plane-auto ticket.

Eastern also challenged its legality, claiming that there is insufficient distinction between a passenger who would use the proposed fares and another traveling on the same flight subject to regular fares, to warrant the distinction.

Although EAL does not compete directly with United on segments involved in the plan, the airline indicated fear of a "chain reaction" if the tariff is approved.

New F-101B, F-102 Orders Expected

Large Air Force orders for two new supersonic interceptors for the Air Defense Command, the McDonnell F-101B and Convair F-102A, are expected to be placed within a few months.

The number of both types now on order is small but indications are that contracts being negotiated will be awarded before the year-end.

The aircraft will replace the three high-subsonic interceptors in use by ADC—the Lockheed F-94C, North American F-86D and Northrop F-89D. Northrop is also slated to build an F-89H for ADC, an interceptor capable of launching the Hughes Falcon missile.

Since the AF is already laying the groundwork for Mach 2 or better aircraft to succeed the F-101 and F-102 by 1960, an early order for these types is virtually a must if they are to achieve squadron service on schedule. Pentagon officials expect they will be ordered in quantity within 90 days.

Pentagon Tightens Security System

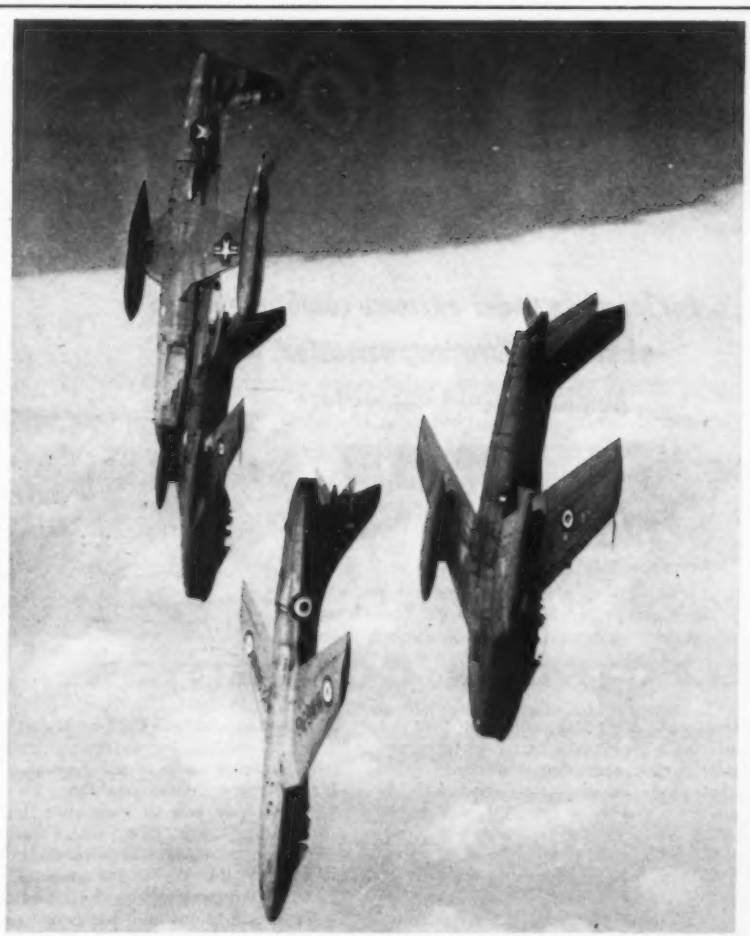
Pentagon's current "brown-out" on the release of Defense information has been further enlarged to encompass "unclassified" data in a warning issued to contractors this month.

Producers of Defense equipment have been warned to exercise "considerable caution" before releasing unclassified economic or technical information.

Pentagon warning, contained in Part 72 of revised Armed Services Industrial Security Regulations, cautions that indiscriminate release of such data in press releases, advertisements, notices to stockholders, financial reports and brochures may prove harmful. Also included were reports answering questionnaires from "unknown or questionable sources."

New rule states that such releases could make easier the job of the saboteur by pointing out potential targets. Assembly, collation and evaluation of this material "could also contribute materially to an accurate appraisal of the strategic intentions of the U.S.," it adds.

Pentagon urges caution in the release of information in these nine key areas: contract awards; vulnerable points within plants; plans and details of equipment and facilities expansion; production methods, techniques and equipment; production and production capacity statistics; sources of semi-finished products, components and supplies; sources of power, other utilities and transportation affecting plant operations; plant security information and information on research and development activities.



JETS OF THREE NATIONS joined forces for unrehearsed nosedive in formation at French National Air Show in Metz, France last month. Leading plane is British Hunter Hawker, flown by Capt. Richard G. Immig, U.S. Air Force, who is serving with Royal Air Force on exchange basis. Two Sabres of Royal Canadian Air Force are on either side, while in "box" position in upper left is Lockheed T-33.

Letters

A Slap at LAX

To the Editor:

The picture of the waiting room in the Kazan (Russia) Airport published in the August 29 issue of AMERICAN AVIATION is quite a departure from the crummy, dirty and inefficiently-designed airport called Los Angeles International Terminal. Most of the people who are forced to use it have more descriptive adjectives for its shortcomings than I have time to think up. But surely, an airport serving the third largest U. S. city should have a better terminal. . . . I no longer use it for trips of under 1,000 miles. For that we have some clean trains on which you will find *courteous* attendants (unlike LAX) and good food.

John L. Kent

Pasadena 2, Calif.

Altschul Analyses

To the Editor:

I am extremely pleased to see that Selig Altschul has joined the AMERICAN AVIATION as a contributing Financial Editor.

I have read his article in the August 15, 1955 issue—"Airline Gains Create Dilemma for Railroads"—which is a most comprehensive and informative analysis of this subject. The article contains a wealth of background material and his comments and conclusions clearly indicate a thorough understanding of the financial aspects of transportation, particularly the air transport industry.

R. G. LOCHIEL
Vice President and Treasurer
Capital Airlines
Washington, D. C.

Liked Fiat Article

To the Editor:

Professor Valletta (president of Fiat Co.) has written to me about the article on Fiat which appeared in the August 1 issue of AMERICAN AVIATION.

Professor Valletta asks me on his behalf to express to you and the staff of your magazine the gratitude of himself and his colleagues for the publication of this article, which they consider to have been prepared with exceptional skill.

Oscar Cox
Cox, Langford, Stoddard & Cutler
Washington, D. C.

'Excellent Job'

To the Editor:

We deeply appreciate the excellent job you did bringing forth the many, many fine attributes of the VARIG operation (AMERICAN AVIATION August 29).

You uncovered several singular items that have escaped the attention of many of us who have been close to the picture. For this we are indebted to you.

CHARLES E. McGEE
Mel Adams and Associates, Inc.
551 Fifth Avenue
New York, N. Y.

Liked TACAN Story

To the Editor:
(Telegram)

Congratulations on your declassification of TACAN article Sept. 12. These facts are entitled to repetition. How fast can you furnish 100 reprints.

LAWRENCE ZYGMUNT, President
General Aircraft Supply Corp.

Detroit, Mich.

Books

Die 2. Etappe.

By C. Walther Vogelsang. Published by "Astra" J. Penyigey-Szabo, 23 Friedrichstrasse, Lahr/Schwarzwald, Germany. 156 pages.

This is a useful review, written in German, of the history of the jet engine, with particular emphasis on the early stages of development work in Germany. There is also a lengthy description of the British role in jet engine development and shorter accounts of the U. S. and French contributions to development of the gas turbine engine. Finally, there is brief note on Italian work in this field.—A.V.

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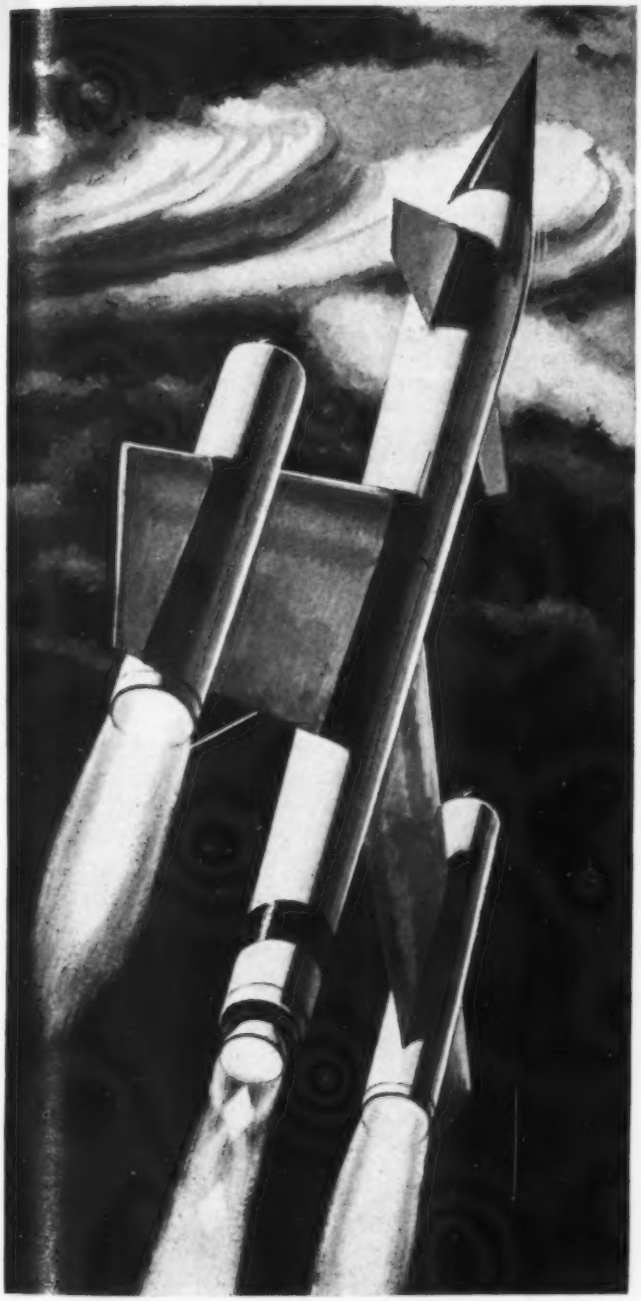

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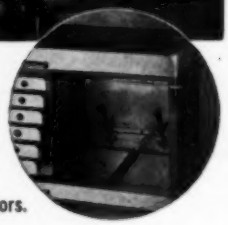
Hot coffee... hot soup... and hot plates... must be hot. No if's, and's, or but's. But to be sure they are... always use Cannon Buffet Unit Connectors.



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Fourteen different types. 10-amp., 30-amp., 80-amp. contacts in a variety of different assemblies. Shells of steel, stainless steel, brass, Dural, or aluminum alloy. Finish in natural, cadmium plate, sand blast, or clear lacquer. Contact solder pots hand-tinned, or threaded stud with hex nut, screw type and pin type. Voltages of 28v d. c.; 118v a. c. The full line of Cannon Buffet Unit Connectors meets your every need... dependably!

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BUC-6-33

Write TODAY for Bulletin BU-1, Buffet Unit Connectors.

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3209 Humboldt Street, Los Angeles 31, California. Factories in Los Angeles; East Haven; Toronto, Can.; London, Eng.; Melbourne, Australia. Manufacturing licensees in Paris, France; Tokyo, Japan. Representatives and distributors in all principal cities.

Circle No. 5 on Reader Service Card.

Production Spotlight

• Convair's forthcoming F-102B delta wing interceptor, to be powered by the Pratt & Whitney J75 turbojet, is expected to be about 100 mph faster than the current F-102A, according to reports from San Diego. F-102A has hit supersonic speed in level flight and is reported to have attained Mach 1.02.

• Republic Aviation F-105, scheduled to be powered by the Pratt & Whitney J75 turbojet, will make its first flight about October 15.

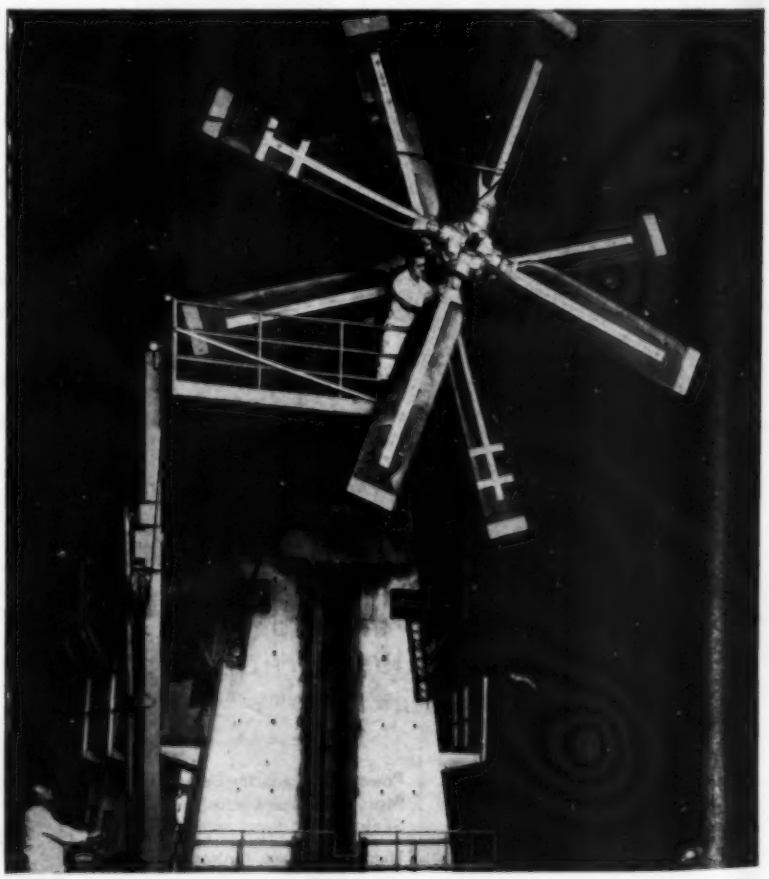
• Four Aeroproducts Model 196A turbo-propellers are slated for installation in a Lockheed C-130 for qualification as an alternate to the Curtiss-Wright Turbolectric props now standard on the Hercules. Lockheed's No. 6 C-130 reportedly will have the Aeroproducts installation.

• Second protoype of the Swiss P.16 fighter should be flying by the end of the year. First plane (AMERICAN AVIATION Sept. 12) crashed recently, reportedly as the result of a combination of engine trouble and bad weather. Pilot bailed out safely.

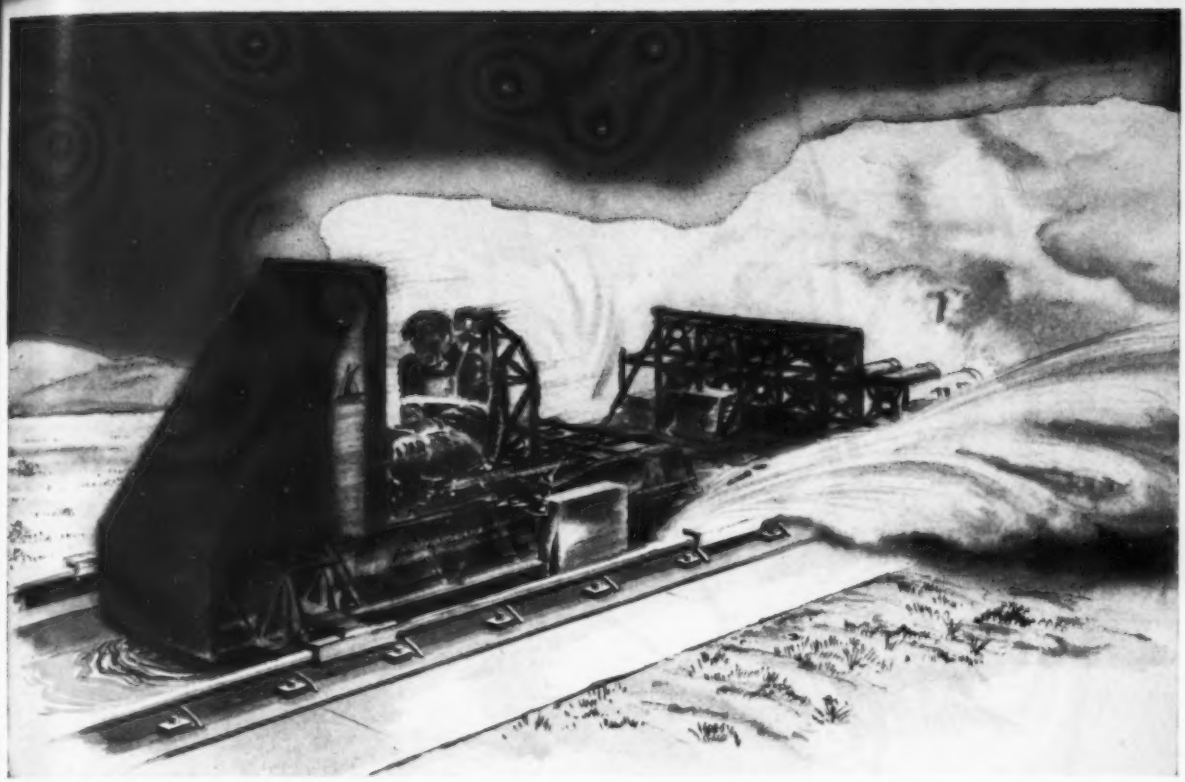
• First delivery of a Wright C9HE-1 engine by Canadian Pratt & Whitney Ltd. is due this month. Company is building the Wright engine under a dual license deal between Wright Aeronautical, the Canadian government and CP&W. About 400 engines will be produced to power Royal Canadian Navy Grumman CS2F-1s being assembled by de Havilland-Canada.

• Price of the SNCASE Caravelle jet transport continues to rise. Latest figure quoted: $1,857,000. Twin-jet Caravelle's flight test program is well along, with 100 hours logged by mid-September.

• First Air Force order for so-called "throw-away" sparkplugs was placed recently with Champion Spark Plug Co. Order is valued at about $250,000 and involves nearly a quarter-million plugs.



LARGEST PROPELLER TEST STAND in the U.S. is this 30,000 hp unit recently unveiled at Wright Air Development Center, Dayton, Ohio. New unit is three times larger than previous largest prop test stand at WADC, is 69 ft. long, 28 ft. high and extends 12 ft. beneath the floor surface. It will accommodate either single or contra-rotating props and it has a range of 330 to 12,000 rpm at full 30,000 hp.



- SOLID- AND LIQUID-PROPELLANT ROCKET POWERPLANTS FOR MISSILE AND AIRCRAFT APPLICATIONS
- AEROBRAKE THRUST REVERSER (SNECMA)
- AUXILIARY POWER UNITS AND GAS GENERATORS
- ELECTRONICS AND GUIDANCE
- ORDNANCE ROCKETS
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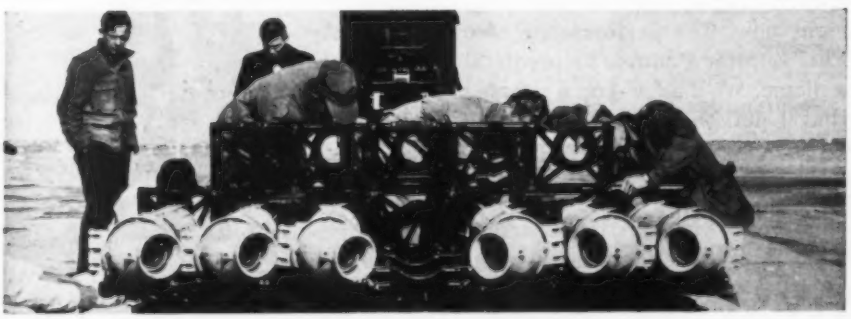
AEROJET-GENERAL NEEDS:
Chemical Engineers
Chemists
Electronic Engineers
Mechanical Engineers
Physicists and
Aeronautical Engineers

The high degree of safety and reliability of Aerojet-General solid-propellant rocket powerplants has been demonstrated by their repeated use on manned test sleds. Shown here is the Northrop sled which received widespread attention during deceleration tests conducted at Holloman Air Development Center, with Lt. Col. John P. Stapp, USAF, subjecting himself to deceleration rates up to 35 G's!

Power for the sled comes from six 5KS-4500 Aerojet-General JATOs, providing 4500 pounds thrust each for five seconds. Actually developed and produced for assisted-takeoff of heavy carrier-based aircraft, the use of the 5KS-4500 on the Northrop sled typifies the variety of applications for which the many existing types of Aerojet-General JATOs may be used.



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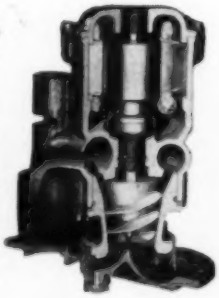

Yes, the HY-V/L can be *tailored* to your specific needs. And that has already been done by such customers as Chance Vought, McDonnell, North American and Douglas.

HY$^{V}/_{L}$* fuel booster pumps

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a product of

HYDRO-AIRE *Inc.* *who also make*
FUEL VALVES • TURBO MACHINERY
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When & Where

Sept. 26-27—Automation Symposium, sponsored by R.E.T.M.A., Univ. of Pennsylvania, Philadelphia.

Sept. 26-30—Air Transport Association meteorology committee meeting, Bent Creek Ranch, Asheville, N. C.

Sept. 26-Oct. 8—USAF second annual all-jet Fighter Weapons & Gunnery Meet, Yuma AFB, Ariz. and Nellis AFB, Nev.

Sept. 27—N. Y. State annual airport development & operations conference, Syracuse.

Sept. 28-29—Industrial Electronics Conference, sponsored by A.I.E.E. and I.R.E., Park Sheraton Hotel, Detroit, Mich.

Sept. 29-30—Radio Technical Commission for Aeronautics, Fall Assembly, Hotel Statler, Washington, D. C.

Oct. 1—Symposium on small gas turbines, sponsored by American Society of Mechanical Engineers and Brooklyn Polytechnic Institute, New York City.

Oct. 3-5—Eleventh annual National Electronics Conference, Hotel Sherman, Chicago, Ill.

Oct. 4-5—Aircoach Transport Association annual meeting, Sheraton-Carlton Hotel, Washington, D. C.

Oct. 4-6—Eleventh annual spark plug & ignition conference, sponsored by Champion Spark Plug Co., Toledo, O.

Oct. 5-7—National Airports Conference (sponsored by American Association of Airport Executives and the University of Oklahoma, Norman, Okla.

Oct. 5-7—National Business Aircraft Association annual meeting & forum, Detroit.

Oct. 5-9—Plastic Fair & Trade Exposition (featuring a number of aviation exhibits), National Guard Armory, Los Angeles.

Oct. 7—Symposium of "Escape from High Performance Aircraft" under auspices of Aero-Medical Engineers Association, Los Angeles.

Oct. 7—American Management Association meeting (address by Trevor Gardner, Asst. AF Sec. for R&D), Sheraton-Astor Hotel, New York City.

Oct. 8-14—Ninth annual All-Texas Air Tour.

Oct. 11-13—Air Transport Association engineering & maintenance conference, Dallas, Tex.

Oct. 11-15—National Association of State Aviation Officials annual meeting, Dallas, Tex.

Oct. 11-15—Society of Automotive Engineers aeronautic meeting, aircraft engineering forum & aircraft production forum, Los Angeles.

Oct. 25-27—American Institute of Electrical Engineers conference on aircraft electrical applications, Los Angeles.

Oct. 26—University Aviation Association annual meeting, Cleveland.

Oct. 26-28—National Aeronautic Association annual meeting, Cleveland.

Oct. 26-28—Southeastern Airport Managers' Association annual meeting, Greenville, S. C.

Oct. 27-28—Aircraft Electrical Society's twelfth annual display of aircraft electrical equipment, Los Angeles.

Oct. 31-Nov. 1—East Coast Conference on Aeronautical and Navigational Electronics, sponsored by I.R.E., Baltimore, Md.

Oct. 31-Nov. 2—Soc. of Automotive Engineers transportation meeting, St. Louis.

Nov. 1-3—Air Transport Association's Air Traffic Conference, San Francisco.

Nov. 2-3—Transport hydraulic conference, sponsored by Vickers, Inc., Detroit.

Nov. 7-9—Eastern Joint Computer Conference (IRE-AIEE-ACM), Hotel Statler, Boston.

Nov. 8-10—National Aviation Trades Association annual convention, Phoenix, Ariz.

Nov. 28-30—Instrumentation Conference and Exhibit, sponsored by I.R.E., Atlanta Biltmore Hotel, Atlanta, Georgia.

INTERNATIONAL

Oct. 10—IATA legal committee meeting, Nassau.

Oct. 11-12—Franco-Italian aeronautical meeting, Paris.

Oct. 13—IATA executive committee meeting, New York City.

Oct. 17-21—IATA eleventh annual general meeting, Waldorf-Astoria Hotel, New York City.

To Produce Jet Engine Blades of Superior Quality—Eaton Developed its famous ROLL-FORM Process

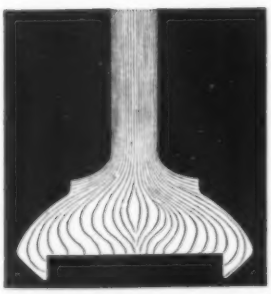

Illustration of section through root of an Eaton Roll-Form titanium blade, showing the excellent flow lines characteristic of this process.

In the Eaton Roll-Form process of producing jet engine blades—a process originated and perfected by the Eaton Manufacturing Company—the complex curves of the blade surfaces are formed by simple rolling operations, in which the grain structure of the metal is rolled to conform to the blade contour. The Eaton Roll-Form blade thus produced combines high fatigue strength and required tolerances—and is made with the most economical utilization of costly raw material.

The development of the Roll-Form process is typical of the many Eaton engineering achievements which have earned Eaton a reputation as a progressive and dependable source of supply to the aircraft industry for more than a quarter century.

EATON MANUFACTURING COMPANY
AIRCRAFT DIVISION
BATTLE CREEK, MICHIGAN

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On Grumman's New F11F-1 Tiger

Parker Fuel Control System maintains

C/G within 1% of MAC

When Grumman Aircraft asked Parker to assist in the design and development of fuel system components for the F11F-1, one requirement was a simple, reliable control system to maintain aircraft longitudinal C/G within close limits through accurate, automatic sequencing of the fuel tanks, widely dispersed from the center of gravity.

To help solve this problem a Parker team of engineers and production specialists from the Fuel Division worked directly with the Grumman design group in order to achieve maximum engineering design and production coordination. As a result of this close teamwork a hydro-mechanical fuel balance system was developed that holds C/G within 1% of MAC. Information and knowledge exchanged first hand between the Grumman engineers responsible for the system design and the Parker engineers responsible for the component design was a large factor in the solution.

During operation of the system, a control unit senses absolute fuel head in forward and aft tanks and feeds these heads into opposing diaphragm chambers at opposite ends of a control valve. This valve in turn operates a shut-off valve between the tanks. Desired fuel head difference is held to ± ½ inch over the complete range of flows, temperatures, and flight attitudes up to 20° climb or dive. One of the principal features of the system is that it continuously works to maintain C/G. Any error is constantly compensated for throughout the entire range of fuel consumption.

...Let a Parker Team help you

A Parker Team is available to you on C/G or other problems involving aircraft fuel valves, hydraulic valves and check valves. If you have a problem in one of these fields or are beginning system design, get a Parker team on your staff.

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Hydraulic and fluid system components

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Personal View

By WAYNE W. PARRISH

Rentschler's Long Look

A REASONED, dispassionate appraisal of U. S. vs. Russian air power by Frederick B. Rentschler not long ago is worth placing in the limelight. An active participant in and a keen observer of the aviation scene since 1917, Mr. Rentschler has been chairman of United Aircraft Corporation since 1934. He expresses opinions infrequently but when he does so they have the ring of experience and authenticity.

"Aviation, since its inception, has been beset by periodic alarms stemming from the human tendency to arrive at a dogmatic conclusion based largely on the sketchiest information or outright rumor," he said. "Some of the current discussion has resulted from statements by men with no direct knowledge of Russian aeronautical developments and often with little regard for known developments both in this country and among its Western Allies.

"There has been a wide variation in assessing 'the facts,' which occasionally were not the facts at all. Some are sure that Russia has now taken over leadership in combat types of aircraft. Some are sure that American military types are definitely superior. Others believe that Russia and the United States are now on a parity. It is little wonder that the public is confused and concerned."

Actually, as he points out, little is known about the exact status and performance of Russian combat types. The Korean war proved that the Mig-15 fighter was good, but not so good as our own North American F-86 Sabre. Meantime the U. S. has gone into production on an entirely new cycle of aircraft. So, in fact, have the Russians.

Turbine powerplants "are sufficiently developed, both in Russia and the United States, so that all important combat aircraft are now turbine-powered in both countries. The efficiency of the powerplant determines and dominates the relative excellence of the aircraft."

The Russians came out of World War II with comparatively little knowledge of the design and production of aircraft, aircraft engines, or of military or transport operations other than in a tactical sense. Then two things happened. The British sold a quantity of Rolls-Royce Nene engines to the Russians, and the latter acquired the services of a substantial number of German scientists.

There is no doubt that the Russians have made great progress in the gas turbine field.

"Acknowledging their technical ability and their vast resources and aware of their continuous absorption with military goals, we find it possible to say that the Russians may have proceeded with turbine developments as far and as fast as we have in America. However, the short-term experience and background of Russia in the art of aviation, in my opinion, makes this fact somewhat unlikely and illogical. It is nevertheless much better to err in the direction of viewing Russian developments as having attained the optimum possible progress than to underestimate them.

"The gas turbine's appearance as an aviation powerplant served almost overnight to equalize the aircraft engine position of all nations and bring about a temporary parity in the air. From the standpoint of research and engineering, the ten years that have elapsed since the war are insufficient to expect any nation to achieve an overwhelming advantage from air power alone.

"In our judgment, we are somewhat more abreast of any world developments at this time. We must additionally take into account our superior production potential and, very importantly, too, our overall planning with particular reference to strategically placed air bases in order to make our operations more effective.

"Tremendous effort has gone into all these factors steadily throughout the years of the cold war. All in all, we have not yet relinquished military leadership in the air, and I, for one, would be unwilling to trade our position for that of any other nation."

Our 1985 Cosmic Entry

IT TOOK a column by David H. Beetle in the Utica (N. Y.) *Observer-Dispatch* to remind us that we neglected to submit our entries in the TWA cosmic contest; you know, the one where they bury the entries out in Kansas City and open up the casket in 1985 and the winner, if he's still around, gets what's left of $30,000 after paying taxes which ought to be 92% by that time.

Dave Beetle just got under the wire because his column, "We Get Around," appeared on July 31, the deadline date. So I guess we're out of luck, but our prospects of being around in 1985 aren't very good anyway and even if we are around we'll be beyond putting the money to the kind of use we still dream about today. But better late than never and with a few deep bows to Brother Beetle (including the outright steal of one of his predictions), here are our best bets for 1985:

1. Eastern Air Lines will be negotiating to take over Colonial.

2. North American Airlines will celebrate its 39th anniversary with a petition to re-open the latest CAB enforcement case on the basis of "new facts."

3. The TWA rocket space ship at Disneyland, which surprised everybody by actually taking off during a full moon in the spring of 1961, will be spotted cruising happily near the planet Venus.

4. Pilots on American Airlines' nonstop jetrockets will threaten to strike unless the "unrealistic" 7 minute and 55 second advertised time is changed to a full 8 minutes.

5. Senator Stuart Symington will demand an explanation from the Defense Department as to why it takes our missiles two days longer to reach Mars than the latest Russian types.

6. Harold Talbott will at long last agree to take the Air Force in as a partner in Mulligan & Co.

7. Local airline presidents will meet in Washington to take positive steps to find a DC-3 replacement.

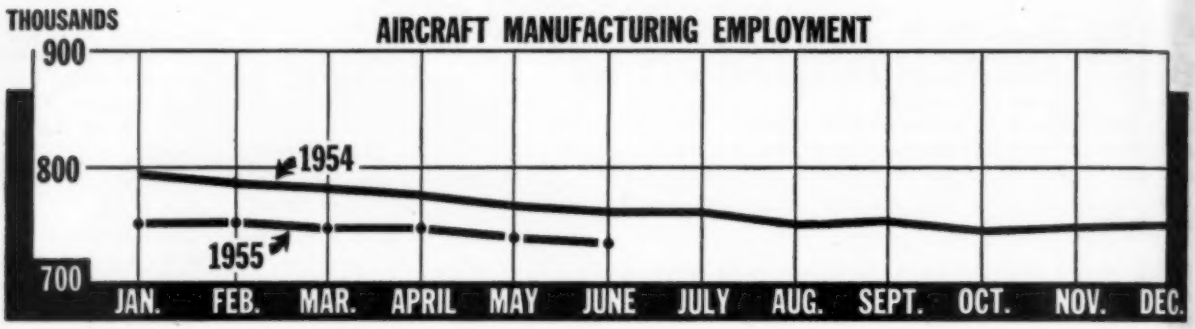
8. Baggage handling time will be reduced to within twice the time needed for a transcontinental trip.

9. Some wag will make a formal speech predicting that air freight will definitely surpass passenger traffic.

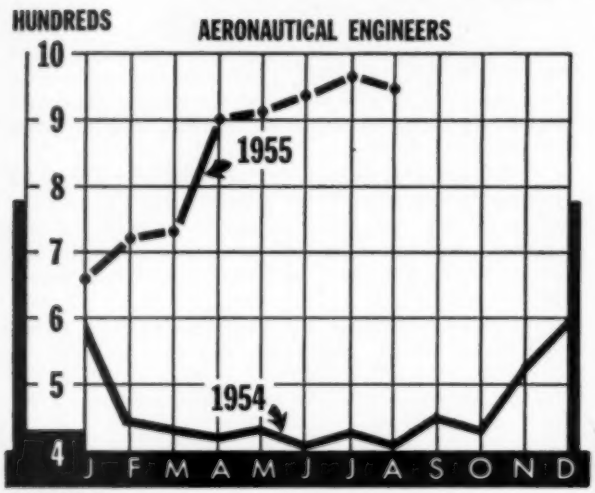
10. There will be no westbound transcontinental departures out of New York before 11 a.m. because passengers complained that earlier trips put them on the west coast before sunrise.

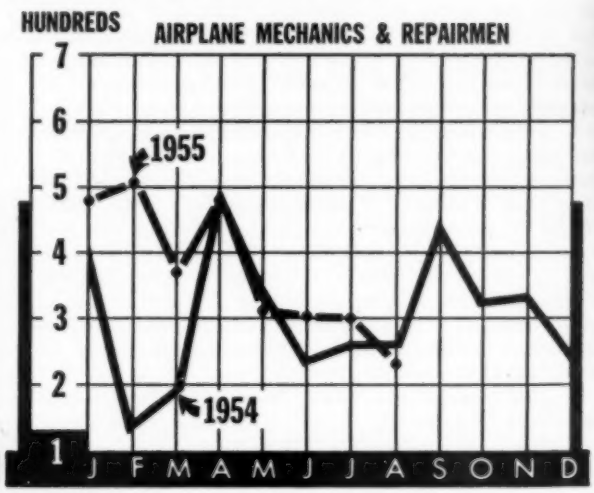
Too bad we missed the deadline. That first prize was a cinch.

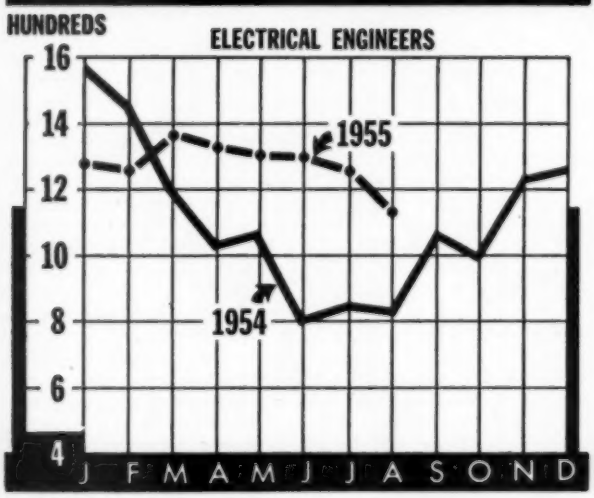
Pulse of the Industry

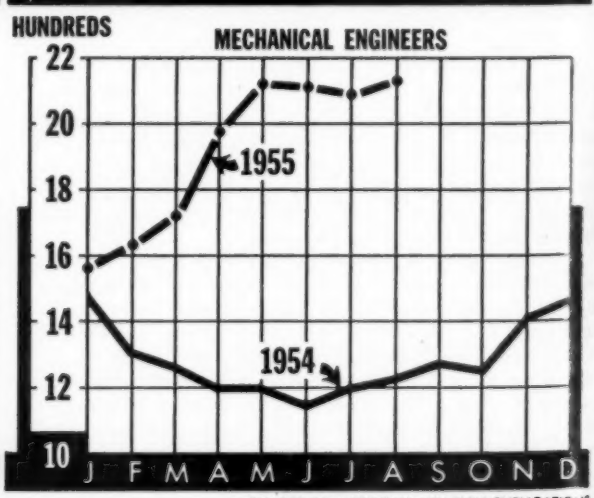


JOB OPENINGS AS REPORTED TO U.S. EMPLOYMENT SERVICE









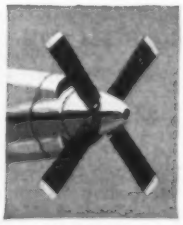
CHARTS BY AMERICAN AVIATION PUBLICATIONS

Aeroproducts synchronized actuators assure positive synchronization of multiple hydraulic cylinders.

Precision Positioning!

AEROPRODUCTS SYNCHRONIZED ACTUATORS PROVIDE INSTANT, POSITIVE CONTROL OF JET AFTERBURNER NOZZLES

AIR-DRIVEN GENERATOR



TURBOPROP

AIR-DRIVEN HYDRAULIC PUMP

AFTERBURNER ACTUATORS

Now, you are assured precise positioning of multiple attaching points on afterburner nozzles when you use Aeroproducts mechanically synchronized hydraulic actuators.

These actuators are now being used on new jet engines under development. Other models combine synchronized travel with additional valuable features such as positive-acting, infinitely positioning brakes, and auxiliary power drives.

What's more, these actuators, in both hydraulic and pneumatic versions, are applicable to all high-ambient temperature installations, including jet engine thrust reversers, flaps, and split-control surfaces on guided missiles.

You'll find Aeroproducts ready to meet your most detailed specifications — for turbopropellers, other propellers requiring high horsepower absorption, actuators, air-driven generators and hydraulic pumps, and other aircraft components now under development.

General Motors engineering leads the way

GM GENERAL MOTORS

Building for today...Designing for tomorrow

Aeroproducts

ALLISON DIVISION OF GENERAL MOTORS • DAYTON, OHIO

AIRTRENDS Washington, D. C., Sept. 26, 1955

NATIONAL SECURITY COUNCIL IS TRYING to decide what action to take on a top-level report warning that the U.S. will probably lose air-atomic superiority to the Russians after 1960.

Report was prepared at NSC direction by a group headed by Dr. James R. Killian, Jr., president of Massachusetts Institute of Technology. The more than 50 men who worked on it (top names in science and industry) had access to all available data on U.S. and Russian work in the aircraft, missile and nuclear fields.

Conclusion was that Russia, which has been giving the intercontinental ballistic missile top priority since World War II, will be predominant in the ICBM field between 1960 and 1965 although evolution of the U.S. ICBM (Convair's Atlas) by that date is not ruled out.

Dr. Killian's group, actually a subcommitee of the Presidential Scientific Advisory Committee, urges two principal courses of action to overcome the unfavorable trend. One calls for a great increase in research and development activities, specifically in the guided missile field. The other recommends stepping up U.S. air defenses, including long-range surface-to-air missiles, radar networks and interceptor planes.

If either or both of these recommendations is implemented, it will mean the end of efforts to balance the budget, and continuing large defense obligations for several years to come.

ONE EXPLANATION FOR THE POTENTIAL cancellation of production of the Vickers 1000 military jet transport is an impending defense budget cut in Britain. Should the Royal Air Force be faced with the choice of dropping some of its combat aircraft or the Vickers 1000, the transport is almost sure to go.

Powerplant in the Vickers transport, the Rolls-Royce Conway by-pass, will probably not suffer, regardless of which way the decision goes. The engine is already getting strong attention in Britain as an alternative to the Bristol Olympus on the Avro Vulcan bomber and is being offered in this country as an optional engine for the Boeing 707 jet transport.

AIR FORCE'S HOPED-FOR MOVE of Air Research and Development Command headquarters from Baltimore to Dayton is back on the shelf, at least temporarily. New Air Secretary Donald A. Quarles has informed Sen. John Butler (R-Md.) that he has directed suspension of all design and planning phases of the move that are specifically pointed toward the Dayton location. Quarles also told Butler he would let him know about what action would be taken when he had satisfied himself on the proper course.

Last April, former Secretary Harold Talbott proposed that ARDC move to Dayton "for reasons of economy and efficiency." However, in June, the Senate Armed Services Committee said the Air Force did not make a conclusive case and asked further study.

STRATOS

AIR-CONDITIONS THE NEWEST USAF BOMBER

THE EIGHT-JET BOEING B-52

The Boeing B-52 jet bomber entering operational service with the Strategic Air Command this spring becomes the world's first heavy jet bomber to go into service.

Joining its medium jet bomber teammate in SAC—the Boeing B-47—the B-52 "Stratofortress" greatly strengthens America's Air Arm. A high flying, high speed heavyweight with a range longer than that of any other operational jet aircraft, it is destined to be the backbone of SAC's striking force for some time to come.

To cool the crew and the tons of intricate equipment aboard the B-52, Boeing picked a highly efficient cooling system designed and produced by Stratos.

Builders of precision equipment for aircraft systems

STRATOS

A DIVISION OF FAIRCHILD ENGINE & AIRPLANE CORP.

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RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

New jet joins trend to Tubeless

THE NAVY'S newest jet fighter, Chance Vought XF8U-1, flies at supersonic speeds in level flight and is designed for carrier operation. To withstand the punishment of high-speed take-offs and landings on carrier flight decks, it is equipped with B.F.Goodrich Tubeless Tires.

The tires were chosen as original equipment on nose and main landing wheels. This makes the XF8U-1 one of the latest additions to a growing roster of military and commercial planes now making safer landings on B.F.Goodrich Tubeless Tires.

Among the features that make the BFG Tubeless Tire safer is the inner liner, developed and patented by B. F. Goodrich. It replaces the conventional tube, retains correct inflation pressure much longer. There's no tube to chafe or leak; no tube to bunch up or shift during take-offs and landings.

Weight saving—as much as 75% of tube weight—is a big advantage of the BFG Tubeless design. Fighters can add more vital equipment. Airliners can carry more pay load (United's Tubeless-equipped DC-6B saves about 48 pounds of weight). And both save time and money in warehousing, maintenance. Instead of a tire and tube, there's only the tire to purchase and stock—only the tire to mount and service.

B. F. Goodrich high pressure Tubeless Tires for fast fighters are in full production along with commercial type Tubeless in large sizes and special service 300 mph Tubeless Tires. All three are examples of B. F. Goodrich pioneering and leadership in Tubeless. *The B. F. Goodrich Co., Aeronautical Sales, Akron, Ohio.*

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VOL. 19, NO. 9

Budget Threat to Airpower Buildup Abates

- **Basic programs unchanged but efforts may be made to pare '56 spending to $34 billion.**
- **Opinion differs even in Pentagon on possibility of saving without hurting U.S. strength.**

By ROBERT M. LOEBELSON

THE NEWEST THREAT to American airpower buildup—coming from the U.S. Secretary of the Treasury—appeared to have abated last week. All signs pointed to a continuing buildup of the U.S. Air Force and the Navy Bureau of Aeronautics, even if the spending involved means no balanced budget before the 1956 elections.

• **Adm. Arthur W. Radford,** chairman of the Joint Chiefs of Staff, declared after spending an "interesting" hour in Denver with President Eisenhower that there are "no plans that I know of to materially change the basic programs adopted two years ago."

• **Reuben B. Robertson,** Acting Secretary of Defense while Charles E. Wilson was vacationing in Michigan, said in a special statement to clear up "public confusion and misapprehension" that the Pentagon will take no steps that will "adversely affect attainment of approved force objectives and military readiness goals."

• **Donald A. Quarles,** new Secretary of the Air Force, emphasized that the AF is planning to maintain "intact" its essential aircraft program and its essential force program. He added, however, that there might be "minor adjustments in personnel and perhaps adjustments in airplane procurement to meet the changing times."

First tip-off that a reduction in fiscal 1956 expenditures was in the works came during the last week in August when the Bureau of the Budget made its mid-year review and indicated that there would be a "decline in total estimated expenditures for major national security progams (including atomic energy) to $38.7 billion, $1.7 billion below the 1955 amount."

On August 30, AMERICAN AVIATION Daily published the first story declaring that the Defense Department was actually facing a cut in spending for fiscal 1956 of nearly $3 billion, of which between $1 billion and $1.6 billion might come out of aircraft and related procurement.

• **One week later,** Pentagon officials told the press that they had been instructed to get the Defense Department spending figure (given as $35,750,000,000 when the budget message was submitted last January) down to $34 billion. And, they added, the Treasury Department had requested that the figure be cut to $33 billion or even less. It was simultaneously indicated that the USAF would have to take the deepest slash, principally because it has more to spend than either the Army or Navy.

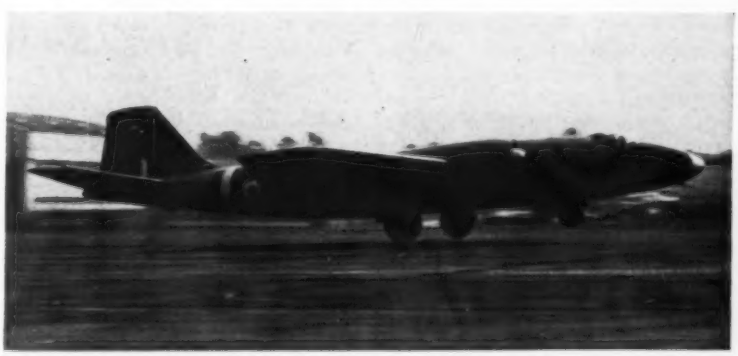
Robertson says the $34 billion figure is not a new one. He indicated the Administration formally forecast it expected to spend $35,750,000,000 last January but at that time said it hoped to trim the sum to $34 billion.

Can expenditures be reduced without harming the buildup of the USAF to 131 wings by next June and 137 wings a year later. Will the Navy be able to modernize its 17 carrier air groups with high-performance jets if it is compelled to pay out less than expected during the 12 months ending next June 30?

• **There is apparently** a wide difference of opinion, even in the Pentagon. Defense Secretary Wilson is known to feel strongly that "you can do a lot with 5%" but he and other Defense Department officials squeezed most of the surplus out of the budget before it went up to Capitol Hill.

One Pentagon official will say only that expenditures this year will be cut "as much as possible." Another feels "it will be a minor miracle" if the $34 billion figure is attained and any effort to go below that will start affecting "hardware."

Admiral Radford, on the other hand, said after talking to Mr. Eisenhower that actual expenditures will be "over $34 billion" and added no one could tell at this point how much more. He pointed out that, in such a large operation as the armed forces, "there are always chances to economize." Moreover, he added, the military services never spend as much as they estimate when the budget is drawn up be-



A NEW ALTITUDE RECORD (for Class C aircraft) was set late last month by this English Electric Canberra light bomber, powered by a pair of Bristol Olympus BOI. 11 engines of 10,000 lbs. thrust each. The plane, piloted by Wing Cmdr. Walter F. Gibb, Bristol assistant chief test pilot, reached 65,876 ft., 3.47% greater than the official 63,668-ft. record set by a Canberra May 3, 1953.

NEW JET STARTER developed by North American Aviation Inc. features a mechanical drive shaft that is powered by vehicle's gasoline engine through hydraulic torque converter. It starts F-100's J57 engine in 14 seconds and reaches idle speed in 20 seconds. This compares with a 50-second start and 60 seconds to idle for other starters.

cause of slippages and other factors.

Quarles reported that the Defense Department is going to try "very hard" to live within the $34 billion expenditure level this year. But, he emphasized, there is no set figure below that total that the Pentagon must attain by Treasury edict.

• **The Air Secretary** said over and over that the AF would not suffer in its buildup attempt because of budget-balancing. "From the figures that I know," he said, "I would say that we are going to have great difficulty in balancing the budget, and not injuring our program, and our present plan is not to injure our program."

It seems fairly obvious, however, that one project close to the USAF's heart does not have much chance of going through during the current fiscal year. It was in August that Trevor Gardner, Assistant Air Secretary for Research and Development, revealed that the AF felt it needed more than $100 million in supplemental funds for fiscal 1956 for R&D activities.

"Technological breakthroughs" (presumably in such fields as the intercontinental ballistic missile and the atomic-powered bomber) were given as the reason for needing the additional money. At the time he made the announcement Gardner indicated the USAF's request was at the Defense Department level for approval and had not yet been cleared with the Budget Bureau before being submitted to Congress.

With attempts at economy already in process, it is difficult to see how the Defense Department (even if it concedes that the additional money is vital to the USAF's mission) will be able to get a supplemental request of more than $100 million approved by the Bureau of the Budget.

• **On the other hand,** the Air Force does have some pretty good friends in Congress and it is conceivable that one or more of them might attempt to provide the additional R&D money.

Both parties are not averse to playing the game of politics, especially in a presidential election year, and while the Republicans are attempting to balance the budget by whittling nearly $2 billion or more off Defense Department spending, the Democrats could try to add some funds for AF research and development and thus claim credit for trying to maintain air supremacy over the Russians.

Actually, the Administration's efforts to cut spending to at least $34 billion had already resulted in politically inspired comments.

• **Sen. Paul Douglas** (D., Ill.) accused the Administration of submitting a "fake military budget" last January in an effort to "claim credit twice for one set of savings." By postponing until now a decision on where the money will be saved, he said, the Administration is "weakening our national defense."

• **Sen. Dennis Chavez** (D., N. M.), chairman of the Military Appropriations Subcommittee, called the planned reductions "a dangerous move" from the national security standpoint and claimed the Republicans are "putting dollars ahead of defense" in driving for a balanced budget and a cut in taxes.

• **Sen. John Stennis** (D., Miss.), a member of both the Armed Services and Appropriations committees, indicated he could not see "any justification in the world picture for a drastic reduction" in military spending.

• **Former President Harry Truman** denounced the planned reductions as "unjustified" and "dangerous." He added, "I hope these reports are not true. A cut in our military forces is too great a principle to be sacrificed on an altar of a balanced budget."

Even Sen. Charles E. Potter (R., Mich.) advised caution. He pointed out Russia's new policy of softness is designed to "get us to let down our guard" and said he hoped any spending cuts "will not in any way take away from our military potential."

But Sen. Styles Bridges (R., N. H.), ranking minority member of the Appropriations Committee, indicated he will press for still more cuts when Congress reconvenes. He declared, "We can continue to make reductions without lessening our defense potential or weakening our defense picture." Bridges did not elaborate.

There appear to be two divergent philosophies at work in the Republican efforts to reduce spending, even if the reductions do not result in a completely balanced budget.

• **President Eisenhower** apparently is convinced that the program laid out for the Defense Department two years ago was and still is the ideal one to cope with Russia. If one may judge from Admiral Radford's comments, the President will tolerate no major changes in those military programs.

• **But Treasury Secretary** George Humphrey and certain other Republicans with more political interests than the President feel there is no use in taking a chance on losing the 1956 presidential election if Mr. Eisenhower should decide not to run again. For that reason, they believe a balanced budget or something reasonably close to it would be an advantage for any Republican presidential candidate.

With the exception of the possible loss of the additional research and development money, the Air Force presumably will continue to buy the aircraft and other "hardware" it had originally planned, although some USAF reductions in spending in other categories are inevitable.

The aircraft industry can therefore relax because the fiscal 1956 sales of aircraft, engines and parts on which it had been figuring after the budget was passed will probably remain at the anticipated level. But even the 1956 picture might change suddenly and the industry (despite previous appropriations) presently has no guarantee that 1957 and 1958 spending will not drop sharply. • • •

Gerardus Herrick Dies

Gerardus P. Herrick, who in 1949 was named "Father of Convertible Aircraft" by IAS and the American Helicopter Society, died in New York Sept. 9. He first demonstrated a convertiplane in 1931. He also perfected the rotary engine, for which he was honored in 1910 by national industrial leaders.

NACA Tells of Aerodynamic 'Breakthrough'

Indented fuselage design hikes speed of supersonic fighters up to 25% in transonic range; discovery kept under wraps for three years.

By JOSEPH S. MURPHY

First official details of a new concept in aircraft design that has hiked speeds of supersonic Air Force and Navy fighters by as much as 25% in the transonic range have been disclosed by the National Advisory Committee for Aeronautics.

Called the area rule of aircraft design, the new concept was discovered by Richard T. Whitcomb of NACA's Langley Aeronautical Laboratory three years ago but has since been kept under tight security wraps.

Although first released to the U.S. aircraft industry on a secret basis as early as September 1952, with its disclosure this month NACA officials are classing the discovery as the most significant "breakthrough" in the history of the research agency.

• **Reason is** that the revolutionary concept has already "made" two of the military's production supersonic fighters that might otherwise have fallen by the wayside due to critical drag rise limitations at transonic speeds. They are the USAF's Convair F-102 delta-wing all-weather interceptor and the Navy's Grumman F11F-1 Tiger, a carrier-based interceptor.

Proven success of the area rule concept on these aircraft has since led to its adoption on the Navy's Chance Vought F8U-1 interceptor, now slated for production, and presumably on other supersonic fighters, bombers and pilotless bombers now entering production or still on the design boards.

What Whitcomb discovered is simply that the sharp drag rise experienced in the transonic speed range primarily results from the combined cross-sectional area distributions of the aircraft's wing and fuselage.

By considering the drag-rise characteristics of the wings, fuselage, tail surfaces and other parts (such as engine inlets) as a whole, he found, total drag for an aircraft design could be greatly reduced.

• **Translating the concept** into design practice, the "area rule" fighter takes on a slenderized fuselage in the wing region, so that the total cross-sectional area of the fuselage and wing together becomes the same as it would be for a streamlined fuselage only.

Tests conducted by Whitcomb in

FULL CREDIT for discovery goes to Richard T. Whitcomb, 34-year-old NACA scientist at Langley Aeronautical Laboratory. Whitcomb joined NACA in 1943, is now assistant chief of Langley's transonic tunnels section.

Langley's 8-foot transonic wind tunnel, starting in 1951, showed that by indenting the "body" or fuselage, drag rise increments associated with unswept or delta wings could be reduced by about 60% near the speed of sound.

On swept-wing models, this redesign eliminated the drag rise at speeds up to Mach 1.04. At higher Mach numbers, the tests disclosed, effects of the indentations gradually decreased.

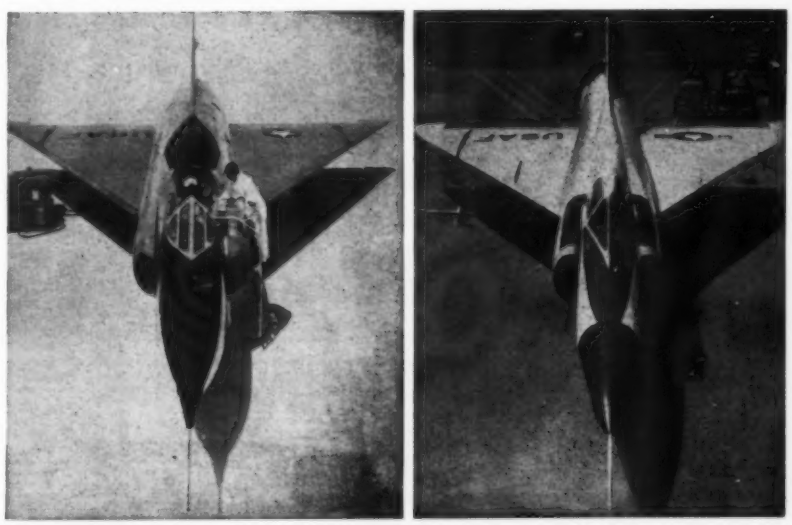
Results of Whitcomb's experiments, which are fully described in NACA research memorandum RM L52H08, dated September 3, 1952, led to these conclusions:

• **Shock phenomena** and drag rise increments measured for four wing and fuselage combinations at zero lift near the speed of sound are the same as those for "bodies of revolution" (streamlined shapes that look like bombs without fins) having the same axial distributions of cross-sectional areas normal to the air stream.

Based on these results, the zero-lift drag rise of a thin, low-aspect-ratio wing-fuselage combination in the transonic speed range is primarily dependent on the axial distribution of cross-sectional areas normal to the air stream. Hence it follows that drag rise for any such configuration is about the same as that for any other with the same distribution of cross-sectional areas.

• **Indenting the bodies** of three representative fuselage-wing combinations (unswept, delta and sweptwing), so that distribution of cross-sectional areas for the combinations were the same as for the original fuselage alone, greatly reduced or eliminated the zero-lift drag-rise increments associated with wings near the speed of sound.

Most striking example of the results of Whitcomb's effort applied to current aircraft design is that of the Convair F-102 delta wing interceptor



DRAMATIC VIEW of area rule in action is this "before and after" comparison of the Convair F-102. Prototype YF-102 (left) had straight fuselage—production F-102A (right) features the "pinched" design concept.

(see photos). Prototype YF-102, which first flew in October 1953, sported a straight fuselage design from the cockpit back to the wing trailing edge area. Its design was an outgrowth of the XF-92A interceptor originally built for the USAF in 1948, a full four years ahead of the area rule discovery.

Drag rise limitations during wind tunnel testing of the YF-102 configuration raised serious doubts that it would ever become the supersonic interceptor it was designed to be. Prospects of USAF cancellation began to loom. However, early application of Whitcomb's area rule precluded that eventuality, and a "pinched" fuselage version was on the drawing boards two months before the first flight of the prototype YF-102 in October 1953.

Little more than a year later, in December 1954, Convair test pilot Richard L. Johnson first flew the "area rule" F-102 past Mach 1 in level flight at 35,000 ft. altitude with no indication of buffeting or other adverse effects.

• **Navy's first crack** at application of the new discovery, that involving the Grumman F11F-1 Tiger, fared more fortunately than the USAF's, purely as the result of timing. The original F11F (then designated F9F-9) was still in the design stages when the area rule came to light and progressive action by Grumman made its performance advantages available right from the start.

As a result, the F11F-1 moved swiftly through its flight test program, making its first flight in August 1954, less than 15 months after the Navy Bureau of Aeronautics gave Grumman a letter of intent for the design.

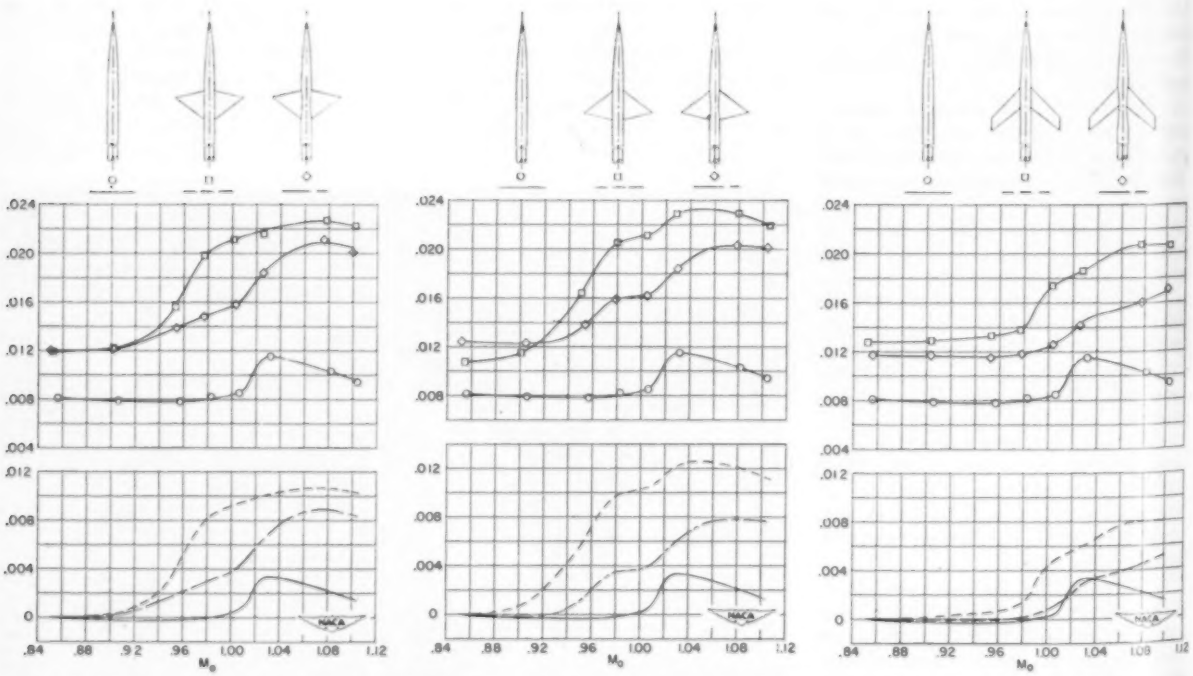
FIRST TO REAP area rule benefits was the Navy's Grumman F11F-1 Tiger which flew in August 1954.

Now, even with three years of success in applying the area rule to new aircraft designs, it is virtually impossible to realize the true worth of the discovery. Today NACA officials view it as not only a powerful, simple and useful device for designing improved performance aircraft, but also as a means to minimize the detailed, time-consuming analysis which was required in the past whenever the effects of wing geometry (thickness, sweep and aspect ratio) were involved.

Whitcomb's findings, made possible only through the existence of the transonic wind tunnel, again point up the significance of the tunnel's development as a NACA research medium. Area rule research was one of the first projects on the Langley transonic tunnel and first got under way in 1951, the same year Langley's tunnels went into operation.

Early recognition of the merit of the transonic tunnel was evidenced in the 1951 award of the Collier Trophy to John Stack, Langley's assistant director, for its design and development.

• • •



RESULTS of Langley tunnel tests produced these zero-lift drag coefficients at Mach Numbers ranging from 0.85 through 1.10 for unswept, delta and swept wing designs. In each instance an indented fuselage version is compared to a model with straight fuselage and a cylindrical body alone. Lower graphs in each comparison show drag coefficient increments in which values measured at Mach 0.85 are subtracted from that recorded at higher speeds to eliminate varying effects of skin friction of the different models.

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Frye Discloses Details of New Transport

Formation of new company to market F-1, four-engine, high-wing monoplane, announced; deliveries expected in 1957.

By LOIS C. PHILMUS

Official announcement of the formation of The Frye Corporation for design and production of a new cargo-passenger transport to replace the DC-3 was made by Jack Frye, former president of Transcontinental and Western Air Inc. (now Trans World Airlines, Inc.), at a recent press conference at The Wings Club in New York.

Frye, who is president and chairman of the new firm, based at Fort Worth, Tex., told newsmen that the plane was "designed primarily to replace the DC-3 for short haul operations and to extend economical air transport to those communities and areas in the world where it is impractical to provide or maintain airports of the kind required by existing equipment."

The four-engine high-wing monoplane has been named the Frye Transport Model F-1. Wind tunnel tests on a mock-up are now getting under way at the wind tunnel at the University of Wichita. A prototype is expected to fly in 1956 and the timetable calls for deliveries sometime in 1957.

• **The Frye Corporation** will not establish manufacturing facilities. Instead arrangements will be made with manufacturers in the U.S., Europe and possibly South America. Original motivation behind the design was to supply under-developed areas of the world with a "new workhorse" for service in "back" areas, but it has since been ascertained that there is a limited market available in the U.S. among the feeder lines. Frye noted that about five or six local service carriers have expressed interest.

As a consequence, manufacturing will be conducted by a U.S. firm and one in Europe—most likely in West Germany. Frye explained that by building the aircraft close to its market, production costs can be kept down sufficiently for sales to be made at the intended $350,000. Frye estimated that roughly 200 orders for the plane would be needed initially to maintain the price.

Discussions are now under way, it is understood, with several manufacturers for building the prototype.

• **Principal feature** of the design is a return to light wing loading, wing loading of only about one-third to one-fourth that of the latest model transport planes—with a resultant reduction in take-off and landing speeds. The prototype will be powered by four 600

Frye

hp Pratt & Whitney geared Wasp engines manufactured in Canada, cruising at 150 mph with a top speed of 170 mph.

As a turboprop, it would be powered by four 850 hp engines. Frye noted that turboprop engine installation is just something being thought about for the future. He said his company is looking at three types, but observed that there is not now a turboprop "near ready for commercial application."

Several forms of boundary layer control, he revealed, will be tried out during wind tunnel tests.

"Paper flights" with the F-1, over routes or one of the local service carriers, showed the new plane should operate at a cost lower than any other existing transports used in short haul. Frye told newsmen that one carrier estimated direct operating costs for the first six months of the year on its 28-passenger DC-3 at about 1.7¢ per seat mile. Rough estimate on the 50-passenger F-1 is 1.3¢ per seat mile.

• **The basic plane** can seat from 40 to 60 passengers. As a cargo plane it offers a clam-shell nose, side loading doors at truck-bed height and an unobstructed interior measuring 40 ft. in length, 10 ft. in width and 6 ft. 6 in. in height.

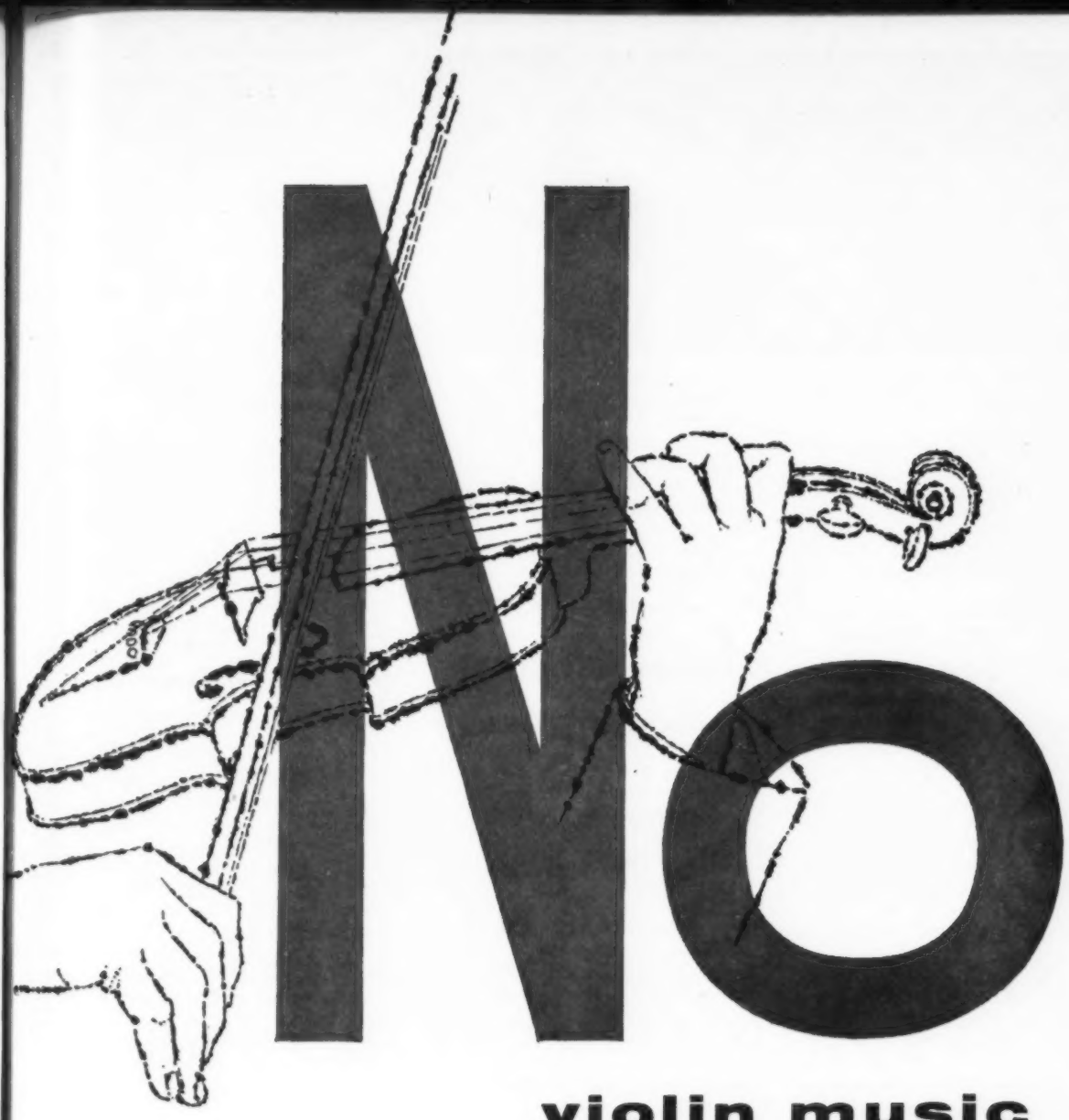
Designers have aimed at a plane that will carry 8,000 to 10,000 lbs. payload in short field operations and 10,000 to 14,000 lbs. payload under less restricted conditions. With a load restricted to between 40 and 50 passengers and a range of 250 miles, it can operate in and out of "extremely small airports of about one-half the size required by a DC-3," Frye said. With normal gross weight, at a speed of less than 55 mph, the plane will take off and land in a distance of 1,000 feet over a 50-foot obstacle.

Key man in the development is Kurt H. Weil, assistant to the president and creator of the Junkers JU52. Francis H. McKillip is vice president and treasurer. Associated with Frye and Weil in development and engineering are: Capt. Walter S. Diehl (USN, ret.), a specialist on airplane design and research and applied aerodynamics; Capt. D. W. Tomlinson IV (USN, ret.) former vice president in charge of engineering for TWA; and Dr. J. M. Frankland, a specialist in both theoretical and

Specs For the Frye F-1

Airplane Characteristics

General	Piston Version	Turboprop
Engines	4-600 hp P&W S1H1-G (R-1340)	4-850 hp turboprops
Normal gross weight	30,000 lbs.	30,000 lbs.
Wing		
Span	95 ft.	95 ft.
Area	1,350 sq. ft.	1,350 sq. ft.
Passenger/Cargo Accommodations		
Seating capacity	50-60	50-60
Cubic capacity (approx.)	3,400 cu.ft.	3,400 cu. ft.
Performance Estimates		
Maximum speed	170 mph	195 mph
Cruise speed	150 mph	170 mph
Minimum speed (at normal gross weight)	under 55 mph	under 55 mph
Service ceiling (1-engine out)	over 20,000 ft.	over 20,000 ft.
Landing distance (over 50-ft. obstacle)	800 ft.	800 ft.
Takeoff distance (over 50-ft. obstacle)	900 ft.	600 ft.



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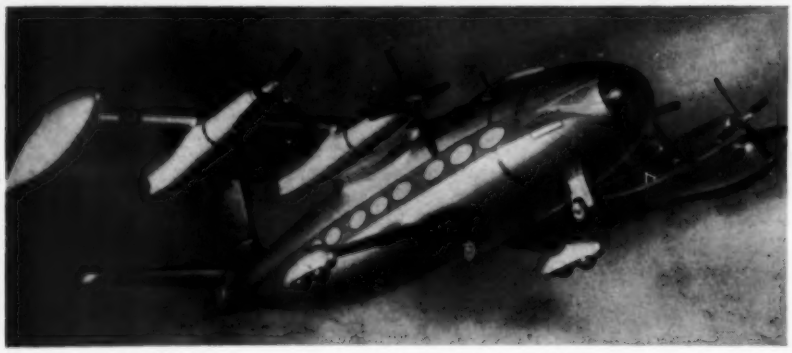

FRYE F-1 WORKHORSE transport features high-wing design with fixed gear. Intended for small airport passenger-cargo operation, it is slated for first delivery in 1957.

experimental work in the aircraft structural field.

Privately financed, the Frye Corporation includes as its directors: Guy W. Vaughn, former president of Curtiss-Wright Corp.; Robert Heller, president of Robert Heller Associates of Cleveland; Charles E. Hunter, president of the Hunter Manufacturing Company of Bristol, Pa.; A. William Morriss III of Morriss Realty Company, Granite City, Ill.; John D. Murchison, Murchison Brothers, Dallas; and Perry R. Bass, Forth Worth. • • •

Broad Inquiry into Military Aviation Planned by Senate Investigating Group

By FRANCIS J. KEENAN

A survey of the aircraft industry's financial status over the past 13 years will serve as a basis for one of the most comprehensive investigations ever attempted by a Congressional committee, according to plans of Sen. Lyndon Johnson's Preparedness Investigating subcommittee.

Preliminary to its "broad inquiry" into every aspect of U.S. military aviation, the subcommittee has released its first report comprised largely of a series of individual and summary tables setting forth industry earnings for 21 major manufacturers during the years 1942-1954.

• **Although** the report's emphasis was placed on industry profits, Sen. Johnson was careful to point out that "we are passing no value judgments at this time."

"We are making no effort," he said, "to state whether these profits are too high or too low—reasonable or unreasonable."

He stressed, however, that in this "renewed effort" to build up U.S. air power, "no one should be allowed to make excessive or unjustified profits."

• **As significant,** perhaps, as the statistics assembled for the subcommittee by the Securities and Exchange Commission, was Johnson's revelation of the broad scope of his group's activity. The subcommittee is seeking, he reported, information "giving the complete development, procurement, and production history and status of aircraft and aircraft engines, and rockets and missile systems under production or development by the Department of Defense, together with complete information concerning production rates, quantities and delivery schedules. Also included in our inquiry are the complete details as to the size and composition of the Navy Air and the Air Force, including numbers and types of aircraft under present and future programming."

Johnson added that the subcommittee staff is also gathering information on the renegotiation of aircraft contracts and the compensation paid officers and directors of the producing companies.

Combined Industry Totals
(in millions)

	1951	1952	1953	1954
Net Sales	$2,590	$4,804.9	$6,468.2	$6,103.5
Profit After Taxes	50.8	112.44	152.0	231.2
Profit After Taxes as % of Sales	2.0%	2.3%	2.4%	3.8%
Profit After Taxes as % of Net Worth	8.0	17.3	21.0	29.4

• **Indications are** that the staff of this Armed Services subcommittee has already gone deeply into at least several areas of its jurisdiction. With seven investigators and counsel on hand, the staff has been at work for several months now on its "broad inquiry," according to one of the staff members. Thus, the first report on aircraft manufacturer's profits could be followed soon by others.

The report's statistical summary showed a steady rise in industry earnings over the past four years, both dollar-wise and as percentages of sales and net worth. The figures for 1951 through 1954 follow:

Wide fluctuations in the industry's volume of business were also revealed by the report. From a World War II high of $8¼ billion in net sales, the industry sank to a postwar low of $735,451,000 in 1946. Volume thereafter steadily rose to a 1953 peak of nearly $6.5 billion and leveled off last year at $6.1 billion net sales.

Slick Board Chairman Lauds Navy Program

A Slick Airways' order for five new Lockheed L-1049H freighters AMERICAN AVIATION Aug. 29 was described by Slick board chairman Delos W. Rentzel as a follow-up to the Navy aircraft leasing program under which lessees agree to order modern aircraft within one year after acquiring planes from the Navy.

Slick leased a Douglas DC-6A from the Navy in July. Its $11-million order for the five Constellations, on which delivery will be made early in 1957, makes Slick the first carrier to fulfill its obligation under the leasing program, Rentzel said.

The former head of the CAB and CAA and one-time Under Secretary of Commerce was enthusiastic about the Navy program, which he described as "a major factor in development of all-cargo service pending acquisition of new aircraft."

Besides lending encouragement, Rentzel continued, the Navy program results in increased national airlift capacity and advances the country's state of readiness to meet emergencies."

CORRECTION

License production of the Boeing B-47 jet bomber by Douglas Aircraft's Tulsa plant and Lockheed Aircraft's Marietta facility is scheduled to terminate at the end of 1956. Sept. 12 issue of AMERICAN AVIATION indicated B-47s would be phased out by Lockheed and Douglas at the end of 1955.

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Jet Flap Demonstration Tops SBAC Show

Development called most significant since gas turbine; knocks out Ketta-Joukowski theory of circulation.

By JAMES H. STEVENS

FARNBOROUGH—Most interesting single item at the Society of British Aircraft Constructors annual display was the National Gas Turbine Establishment's jet flap demonstration.

While the jet flap still is in the laboratory stage and its fundamental mathematics and empirical working data have yet to be fully established, it is, in the opinion of this writer, the most significant development since the gas turbine.

It completely throws overboard the whole of the basic Kutta-Joukowski aerodynamic theory of circulation, because there is no circulation.

• **The idea,** which originated in the Aerodynamics Department of the N. G. T. E. some two years back, consists of ejecting the *whole* of the engine thrust through a slot across the entire trailing edge—the engines have no jet nozzles.

At low speed the jet "sheet" strikes down at 60 degrees and acts like a huge extension flap forming a barrier to the rearward flow of the air under the wing. Air is thereby entrained over the top of the wing and forced downward behind it to give the upward reaction. In addition there is the upward component of the jet thrust itself. That is pretty obvious, but the surprising feature of the system is that there is a strong forward suction component—greater than the reaction to the horizontal component of the jet thrust.

A relatively thick airfoil is used in order to get a well-rounded leading edge and to allow space for internal jet ducting. The jet exhausts through a slit above a tiny flap, the sharply-curved rear surface of which turns the airflow downward by Coanda effect.

Variation of the angle of the jet from about sixty degrees to zero would control the lift coefficient from a maximum of around 11.0 for take-off and landing to 1.0 for level high-speed flight. Thus the elevator control is replaced by jet (or "flap") variation and, since the jet must extend the whole span, spoilers would replace ailerons.

• **The jet flap** is *not* a VTOL device, since forward speed is required to get the system working—but 50 m.p.h., perhaps even less, is necessary. The N. G. T. E. demonstration showed an envisaged city center airfield about the size of New York Grand Central Station. An intercity airliner using the jet flap principle would probably be rather like the Bréguet integral, with inter-connected turboprops "soaking" the whole span in slipstream and the jets exhausting via a manifold to the slot, so giving safety in case of engine failure.

FAIREY ULTRALIGHT ARMY helicopter is powered by a Blackburn/Turbomeca Palouste air compressor. Note observer's seat on the left side faces rearward to give crew 360 deg. vision.

Although the divided trailing edge gives structural strength problems and the steel ducting and lagging would be heavy, they are likely to be simpler than the mechanics of multiple flaps and also much lighter.

Because of the thick airfoil, high speed of a jet flap wing might be limited to 500 mph cruising—which is much more than any airliner yet in service—and either several small buried turbojets or turboprops could be used. Indications are that with present wing and thrust loadings the jet flap would virtually eliminate runways. By using a spanwise leading-edge slot for the air intake, boundary-layer control could well lead to big cruising drag reduction.

• **The Herald** 44-seat pressurized airliner is marketed as a "DC-3 replacement," but is really for much denser routes. With its high aspect ratio wing, high-lift extension flaps and four Alvis Leonides Major radials it has an excellent take-off performance and has been designed to operate from grass strips.

The Scottish Aviation Twin Pioneer is an application of the company's jungle flying experience with the Prestwick Pioneer to a twin-engined bush liner. At the show it was flown in and out of a 300-foot strip with the help of its large extension flaps and slats. Albeit the airplane was light, low-speed control was good and it flew level with only a waffle of power from its two 550 hp Alvis Leonides radials.

Both these airplanes gave evidence of rugged construction and design for easy maintenance in the field with a minimum of special equipment.

• **The Fairey P-1** delta, which is 52 feet long, with a span of only 26 feet, proved to have a very slim fuselage and an almost nil view from the metal canopy. Designed for high altitude research toward Mach 2, the only concession to low-speed flight is the droop-snoot cockpit, which assumes a level angle when the airplane is at high landing incidence.

The Folland Gnat appeared markedly more agile than the Midge, as a result of the extra thrust of the Orpheus, and was maneuvered in tight turns, aided by its moderate wing loading of 40 lb./sq. ft. Because it is so small (its span is only 22 feet) it appears to land fast, whereas the normal approach speed is actually only 133 mph.

The Fairey Ultra-light helicopter is an army two-seater designed and built

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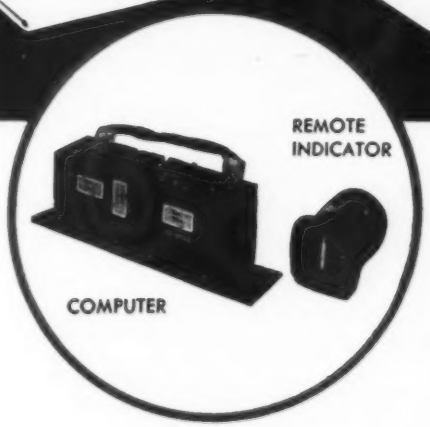

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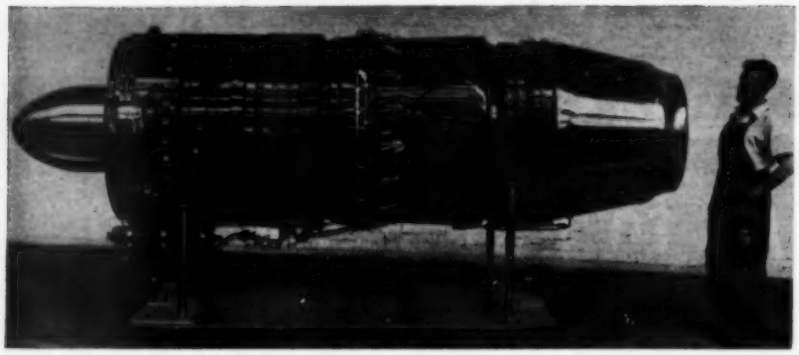
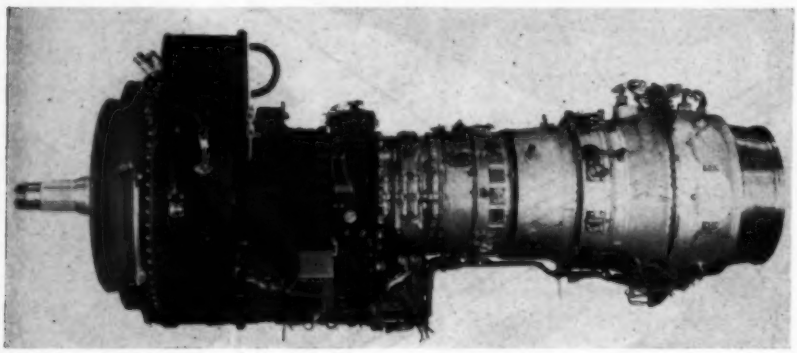


de HAVILLAND GYRON has undergone a 150-hr. type test at an initial rating of 15,000 lbs. thrust. Engine is 154 in. long and has a diameter of 46¼ in., making it one of the world's largest as well as most powerful turbojets.



ROLLS-ROYCE RB109 turboprop was unveiled a few days after the end of the Farnborough. This is the first photo published of the 4,000-hp unit which is aimed to consolidate R-R's predominant position in the commercial turboprop market gained with the Dart.

in a little over a year. One prototype has already put in several hours' flying and three more are nearly ready for flight. Simplicity is the design keynote: a light-alloy box floor, a box-beam tail and rotor pillar, simple perspex covering. The engine is a Blackburn-Turboméca Palouste air compressor which delivers to pressure-jet nozzles at the rotor-blade tips, where fuel is burned to give extra thrust. A rocking rotor head with hanging-stick control is used in preference to the complexities of cyclic pitch. A civil variant is already in hand.

The Fairey Ultra-light is noisy, but nothing compared with the Jet Gyrodyne, which made the first public demonstration of conversion from jet rotordrive to propeller/autorotation cruising flight. This aircraft sounded like an ancient, leaky shunting engine.

• **de Havilland** exhibited the massive Gyron, 15,000 pst initial rating and 46¼ in. in diameter. This is a simple, single-spool axial intended primarily for supersonic interceptors. Rolls-Royce showed the Conway by-pass of 13,000 pst, which may prove to be the formula for the future Atlantic airliners. It looks much like an Avon and is only 2½ in. greater in diameter.

Napier exhibited its Oryx, the Eland and two missile HTP/kerosene rocket motors. The production type, the NRE 17, was very neat, in welded sheet steel, presumably ceramic-lined, and with sequence valves grouped on the thrust plate within the combustion chamber diameter. Used in an English Electric missile, the size of the unit suggested a peak thrust between 2,000 and 3,000 pounds.

The writer was privileged to fly in the Eland-Elizabethan testbed on the opening day of the S. B. A. C. Display during the demonstration. The airplane is one of the original prototypes, but is fully furnished to B. E. A. standard.

The Elands are noticeably quieter when taxiing out, on the take-off and during the climb.

On the demonstration the lightly loaded plane was pulled up at about 30 degrees, like a fighter. When it is throttled to cruising power, a loud whine appears to develop. This proved to be the noise of the inverters and a cabin fan, installed in the standard B. E. A. Elizabethans, *but inaudible because of the noise of the Centaurus piston engines*—yet passengers agree the Elizabethan is a very quiet airplane. A feathering and re-light demonstration were very smooth and the pilot used the gun on a flat approach with an immediate response like a piston engine.

• **Seen around** were some other interesting items: D. H. has made an H. T. P. starter for large turbojets but was caught without information . . . the Girling Brake Company is making a vane-type hydraulic flutter damper for supersonic powered flying controls . . . the Folland Gnat inboard ailerons droop 20° when the gear is lowered and have increased movement . . . Short Brothers and Harland is in production with the 25-foot long, 17-inch diameter G. P. V. rocket . . . Martin-Baker gave test-tower ejection-seat rides to volunteers, and wiped the smile off most faces . . . Elliott Brothers is making a lock-on missile radar head . . . Westland Aircraft has made a five-seat version of the S-51, the Widgeon, using the S-55 rotor head . . . the Avro Vulcan four-jet bomber was slow-rolled with Britain's Prime Minister, Sir Anthony Eden, on board . . . the long spins from 10,000 ft. of the Avro CF-100 were *started* at the bale-out height for a swept-wing fighter. • • •

Hi-Per DC-3s Safer, More Profitable, Forum is Told

MILLVILLE, N. J.—The prospect of a safer and more profitable operation of DC-3 aircraft when fitted with more powerful Pratt & Whitney R2000 engines was again the key topic of discussion early this month as Airwork Corp. conducted its 6th annual P&W engine operation and maintenance forum.

For the third consecutive year, the so-called Hi-Per DC-3 modification engineered by Pan American World Airways and Pan American-Grace Airlines found a receptive audience among representatives of major corporate aircraft fleet operators in attendance.

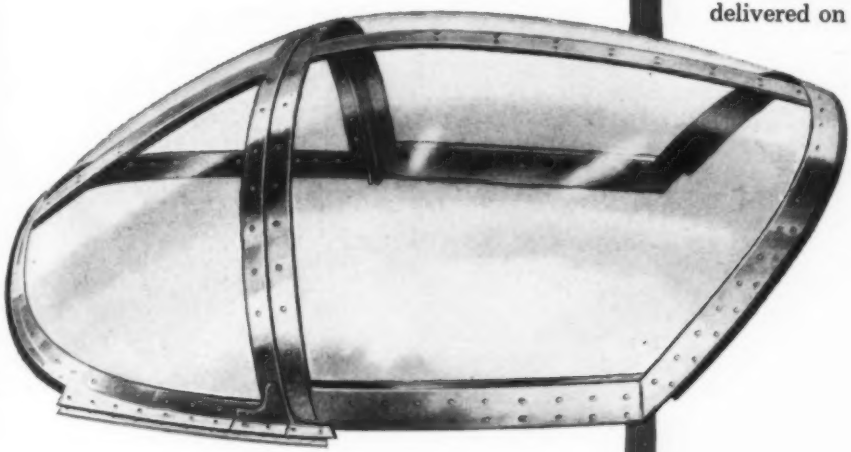
A first-hand report on experience with the R2000-powered DC-3 in executive flying service was volunteered during the session by R. E. Sheriff, chief pilot for Thompson Products, Inc. Sheriff said that in nearly 400 hours flying since taking delivery of the airplane in February its operation has been without problems.

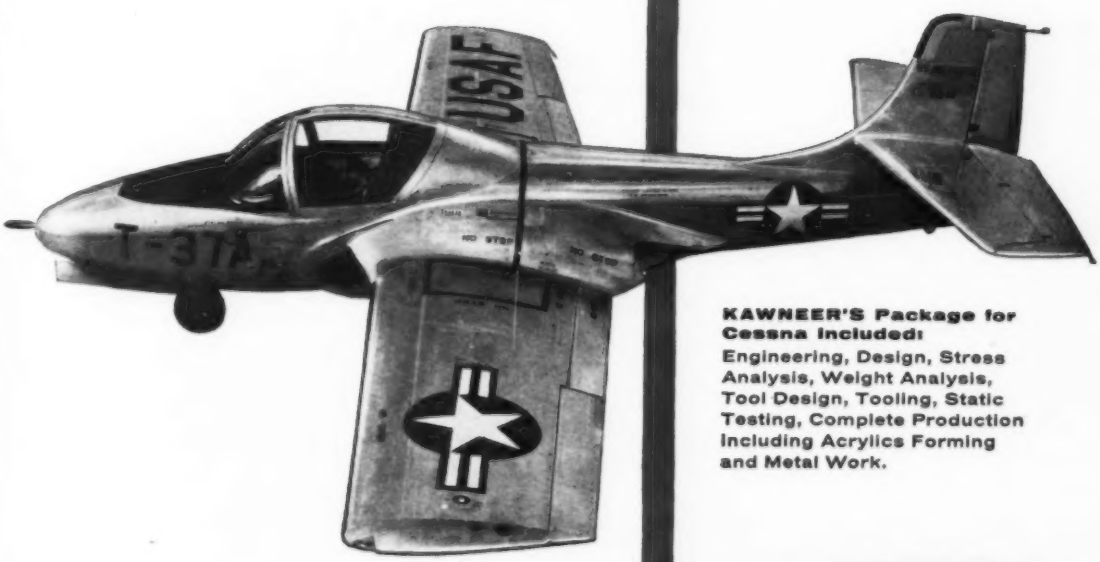
• **Experience to date** shows that when operating the two R2000-7M2 engines at 750 hp cruise power, fuel consumption has been between 125 and 130 gallons per hour. Cost of the rework, he said, runs between $90,000 and $100,000 but much of this is represented in the price of new engines, accessories and propellers. Thompson operates two DC-3s and is now planning the R2000

Kawneer "package" service provides economy in Cessna Cockpit enclosure

Kawneer provides quality, economy and delivery again! Last Fall Kawneer started the Cessna T-37 side-by-side cockpit enclosure project and delivered the first unit this Spring. This "on schedule" procedure was possible because Kawneer has formed an integrated "package" of engineering, design and production in the cockpit enclosure field.

As specialists working with acrylics and metal in the production of cockpit enclosures, Kawneer offers you quality products, economically produced and delivered on time.





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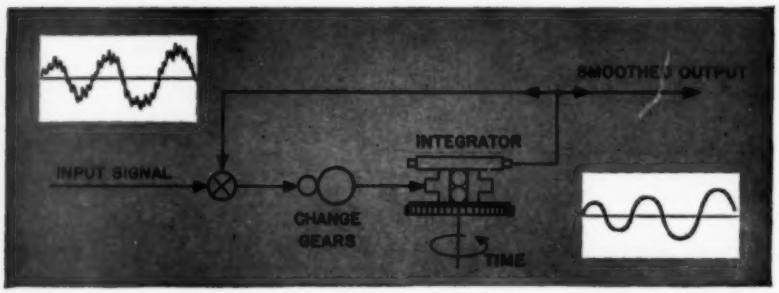
SINCE 1915 LEADERS IN AUTOMATIC CONTROL

Smoothing Signal Noise with the DBR* Integrator

Confronted with the well-known problem of random fluctuations called "noise," Ford engineers have employed the earliest and best-known Ford component – the disk integrator. Used in Ford analogue computers, the disk integrator smoothes random fluctuations due to extraneous influences and obtains an average of the received signal. Thus, a device originally designed by Ford for integration is successfully used as a mechanical counterpart of the RC Filter.



The Ford circuit operates on the premise that the older the data the less important it is. Therefore, data smoothed must be weighted in proportion to its age, so that the weight assigned to it decreases exponentially with time. The output of the circuit then represents the summation of this weighted data and tends to ignore random noises of short time duration.

As shown in the drawing, the incoming signal (with noise superimposed) is the input to the differential. As long as the integrator output (the roller) rotates at the *same rate* as the incoming signal, the differential output (error signal) is stationary and the integrator carriage remains stationary. But any change in the incoming signal produces changes in the *error signal* which tends to displace the integrator carriage and thus restore the system to equilibrium.

This reaction, however, is not instantaneous. It occurs after a certain time-lag which may be adjusted by the gear ratio. If the signal is of brief, random nature, the time-lag of the integrator will prevent its acting on the system. On the other hand, a permanent change in the signal will displace the carriage and change the output of the system.

This use of the Ford disk integrator as a noise smoother exemplifies the flexibility and adaptability of Ford components and ideas.

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installation for the second aircraft.

Earlier P&W spokesmen told more than 150 technicians in attendance that the higher-powered engines in the DC-3 will "make more money" than the standard R1830 engine model and at the same time provide a reserve in available power as an added measure of safety.

The Airwork session was one of two forums of its type sponsored jointly by Pratt & Whitney and its authorized overhaul agencies this month in the east and southwest. The other session, co-sponsored by Southwest Airmotive Co. in Dallas, attracted a similar large attendance by executive aircraft operators located in the midwest, south and southwest.

• **New feature** of this year's meetings was a discussion of present and future developments in the field of engine accessories spearheaded by Bendix Aviation Corp.

These discussions emphasized the wide area of interest represented in the mushrooming executive aircraft business. Topics ranged from the development by Bendix Scintilla division of new silicon-impregnated spark plug leads for current piston engine types to that of the only "qualified" fuel/air combustion starter for jet engines by Bendix Utica division.

Advantages of a changeover to the high-capacity type C-4 oil pump on R1830 engines were brought out during a question and answer session on current engine problems. P&W technicians explained that the maximum allowable oil flow for R1830s is 108 pounds per minute, compared with 85 to 89 pounds for a "good" engine.

If oil flow progresses above 95 pounds, it is necessary to install the C-4 pump in order to maintain minimum oil pressure during hot weather operation.

• **Current Airwork program** for expanded customer service through the addition of offices in Newark, N. J., and Atlanta, Ga., was outlined during closing remarks by its v. p.-sales, J. W. Gillespie. During the past year, he said, Airwork has also expended some $30,000 in improved shop equipment for its Millville facility, including a new shot peening fixture, a cylinder base lapping machine, a new propeller governor and generator test stands.

Recent addition of Mohawk Airlines to Airwork's growing list of airline customers raises to 25 the number of foreign and domestic carriers now using Airwork-overhauled engines. The roster includes 13 U.S. and 12 foreign operators and takes in all P&W engines from the R1830 through the latest R2800-CB16 models. • • •

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The Boeing KC-135 jet tanker-transport is of vital importance to the national defense. The prototype of this airplane—America's first jet transport—is shown above. To produce and deliver KC-135s to the Air Force as rapidly as possible, Boeing enlisted the aid of Twin Coach Aircraft Division as a subcontractor for major airframe assemblies.

This important assignment typifies the way prime contractors rely on Twin Coach Aircraft Division. For Twin is staffed with experienced aircraft specialists to design and build tooling . . . with experienced aircraft production personnel . . . under experienced aircraft supervision and management.

If you have an assembly you're thinking of subcontracting, call Twin Coach Aircraft Division. You'll be secure in the knowledge that your assembly will be built by *aircraft* specialists—by men whose sole aim is to build to specification . . . on schedule . . . at the lowest possible cost.

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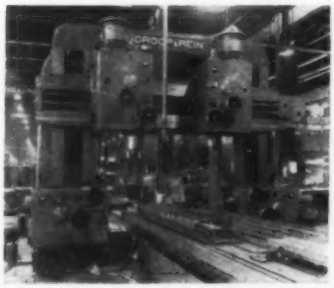

Giant 25-foot Droop & Rein universal planer mill, only one of its kind in the country, was recently installed at Twin Coach Aircraft Division.

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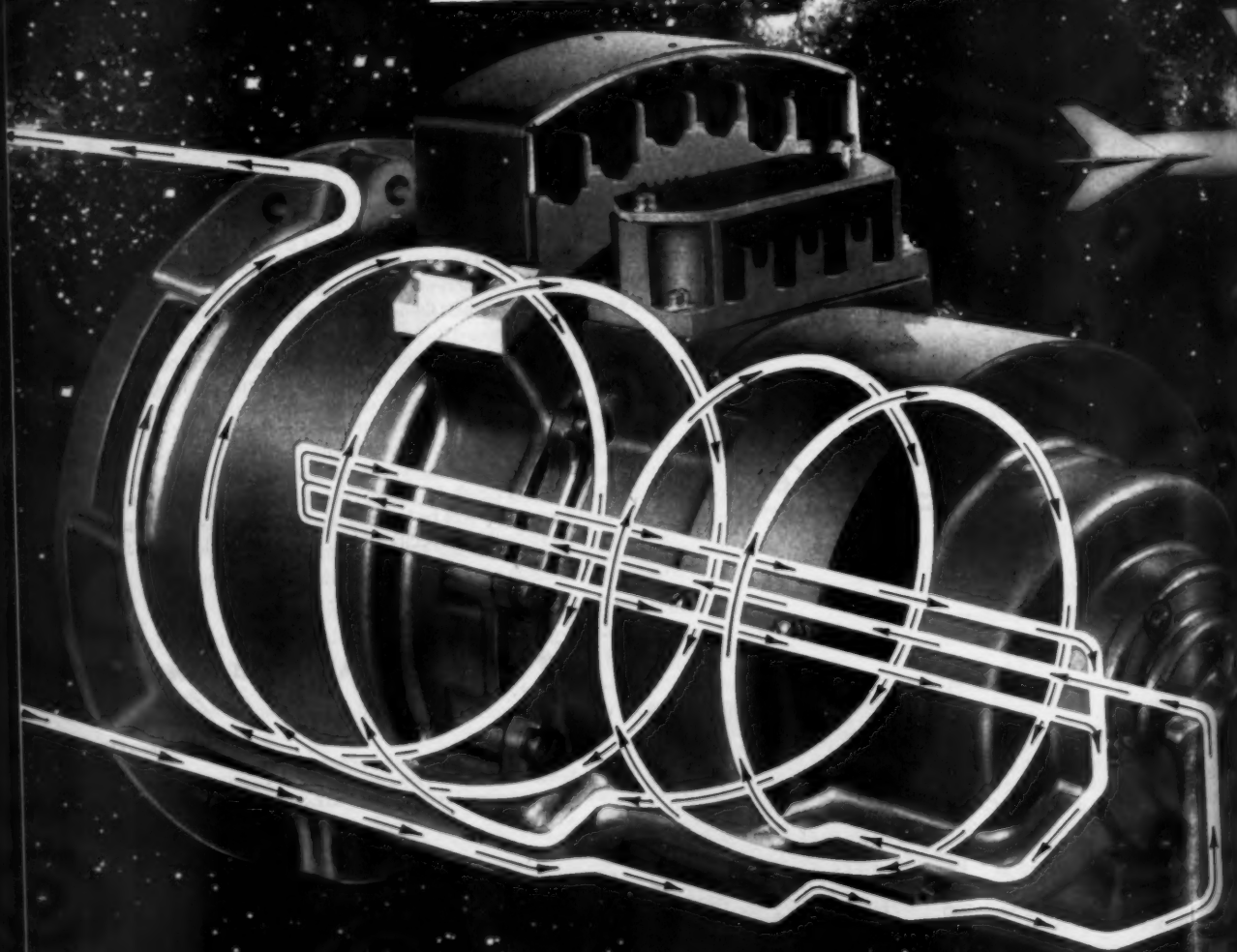

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Westinghouse research in the field of semiconductors produced the high-temperature silicon diodes that are the key to the operation of this new generator. A-c power generated in the exciter armature is fed into the silicon rectifiers mounted on the generator shaft. The resulting d-c output supplies the main rotating d-c field.

Without brushes, aviation gas turbine engine oil can cool and lubricate the generator. Oil is pumped through the generator shaft, through tubes in the frame casting, and is used in the hydraulic constant-speed drive. All heat picked up by the oil is dissipated in the engine oil cooler. The generator operates safely with engine oil at temperatures up to 300 degrees Fahrenheit. All the usual generator trouble spots are eliminated—no brushes or commutating parts to wear, bearing lubricant is continuously replaced.

This is the first generator that is completely integrated with its drive, with the engine oil cooling system and with the balance of the electrical system. It is completely enclosed; there are no air tubes or ducts to occupy space and clutter up the airframe; all external oil seals are static and there is no overboard drainage of oil. No additional plumbing is required because the extension of the engine oil lubricating system is all internal. Now—aircraft altitude and speed will no longer be limited by the electrical system—a big step toward helping you bring tomorrow's aircraft . . . one step closer. J-91024-B

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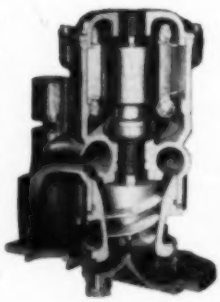

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Business of Suppliers, Subcontractors to Top $2 Billion This Year

The volume of aircraft business that will be done by suppliers and subcontractors during 1955 will be well over the $2-billion mark and a moderate increase is expected in 1956 despite a gradual decline in aircraft production, according to a survey made by the Aircraft Industries Association.

The survey report noted that there are still substantial opportunities for new orders for competent, efficient, low-cost manufacturers, large and small.

Supply and subcontracting procedures will not be changed materially in the near future unless there is a radical revision in the national defense structure, the report said. There has been however, a significant change in the philosophy of procurement officials. Size in itself is no longer regarded as the basic criterion when a source of supply is selected. Quality, reliability and low-cost production are regarded as equally important factors.

AIA's report concluded that marginal manufacturers will be dropped and contract awards will be made to those firms which can produce the high quality products required at the right time and at the best prices.

In many instances, AIA said, the survey disclosed that small firms are able to make some parts and components faster, better and cheaper than the prime contractor. The survey further showed that:

- $4,759,320,000, or 54% of all disbursements, excepting taxes, was paid to 50,000 subcontractors and suppliers all over the nation.
- $2,030,000,000, or 43% of all outside purchases placed by the 35 major aircraft, engine, components and accessories firms participating in the survey, was placed with small business firms (employing less than 500 people).
- An additional $1,000,000,000 was paid to small business firms through second, third and fourth-tier supply and subcontracting activities.
- Small business firms comprised 83% of the suppliers and subcontractors to the aircraft industry.
- $2,700,000,000 was paid for services and products received from large business firms (employing more than 500 people).

California, with its complex of aircraft manufacturing companies, led the list of 50,000 subcontracting and supplying firms with 10,314, the AIA survey showed. Ohio was second with 4,487 firms; New York third with 3,382; Texas fourth with 1,615; and Connecticut fifth with 1,513. • • •

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The first Civil Aeronautics Administration certification for commercial use of a U. S. designed and built turboprop propeller has been awarded to Model CT634S of the Curtiss-Wright Turbolectric series.

The CT634S and other Turbolectric models are already in quantity production for some of the nation's most advanced military aircraft types – both operational and experimental. The new CAA certification now makes available to commercial airlines the high standard of performance and the flight demonstrated efficiencies of Turbolectrics.

Propellers provide the most efficient means of converting gas turbine power into useful thrust. Curtiss-Wright Turbolectrics—with one-piece extruded hollow steel or solid dural blades – feature full synchronization plus synchrophasing . . . full feathering, by either manual or automatic means . . . fast reversing . . . single-lever power control.

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Curtiss-Wright has permanent career positions open for specialists in advanced engines and propellers, metallurgy, electronics, nucleonics, ultrasonics, plastics and chemistry. New 85 square mile Research and Development Center at Quehanna, Pennsylvania and expanded divisional engineering programs are creating opportunities for more engineers, technicians and scientists in both aviation and diversified industrial projects.

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Defense is our business...

From earliest cannon-carrying fighters to the most advanced guided missile weapons systems, Bell Aircraft has pioneered for twenty-years in the design and production of new armament for our nation's security.

The defense industry at long last is an integral part of our national economy. Bell is a specialist in many facets of this business of defense. Our engineering and production teams are constantly applying the newest in scientific and manufacturing techniques to widely diversified programs:

> *Guided missiles capable of delivering nuclear weapons to an enemy many miles away . . . rocket engines for super speeds and altitudes . . . electronic and servomechanical devices for precise performance and control . . . research aircraft for the accumulation of invaluable data . . . vertical rising aircraft for a new dimension of flight . . . helicopters for every type of military operations, including quick evacuation of wounded . . . all-weather automatic landing systems for land or sea-based planes . . . a wide variety of high quality, assembly-line produced systems and components for industry and government.*

In guided missiles, Bell is prime contractor for the strategic, long range GAM-63 Rascal, one of the few contractors to undertake the *complete* weapons system assignment from airframe to rocket engine, from its electronic components and servos to ground-support equipment and training devices.

In one of the country's largest and best equipped rocket engine facilities, Bell has developed and is producing engines for the Rascal and Nike missiles as well as for other projects. The famous Bell series of high performance research aircraft — X-1, X-1A, X-2 and X-5 — is supplying today's information for tomorrow's tactical planes.

Improved Bell helicopters are serving every branch of the military services. The revolutionary XV-3 convertiplane will provide a link between fixed-wing and rotary-wing aircraft and the Bell jet VTOL (vertical takeoff and landing) promises to change the entire concept of military and commercial aviation, launching a new era of flight.

These and many other projects are being pushed forward to gratifying conclusions by a company founded on the premise of helping to make America strong. In hot war, cold war, or peace, Bell Aircraft's engineers, skilled factory workers and modern facilities work progressively toward protecting our American way of life. National Defense has always been, is now, and will continue to be *our business.*

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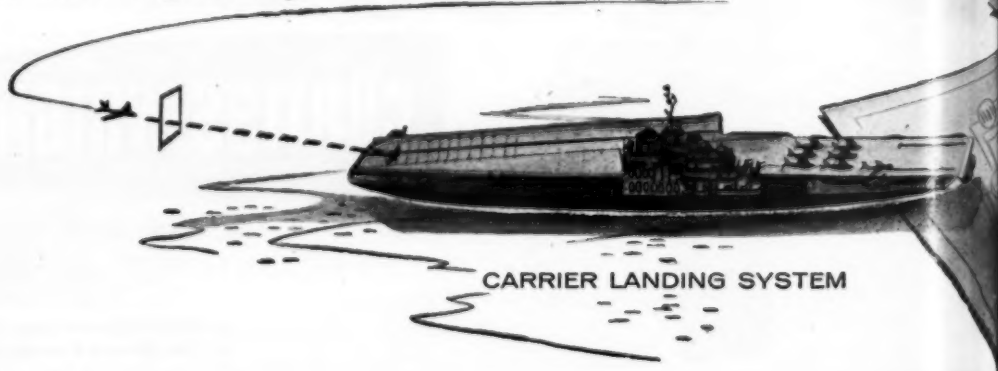
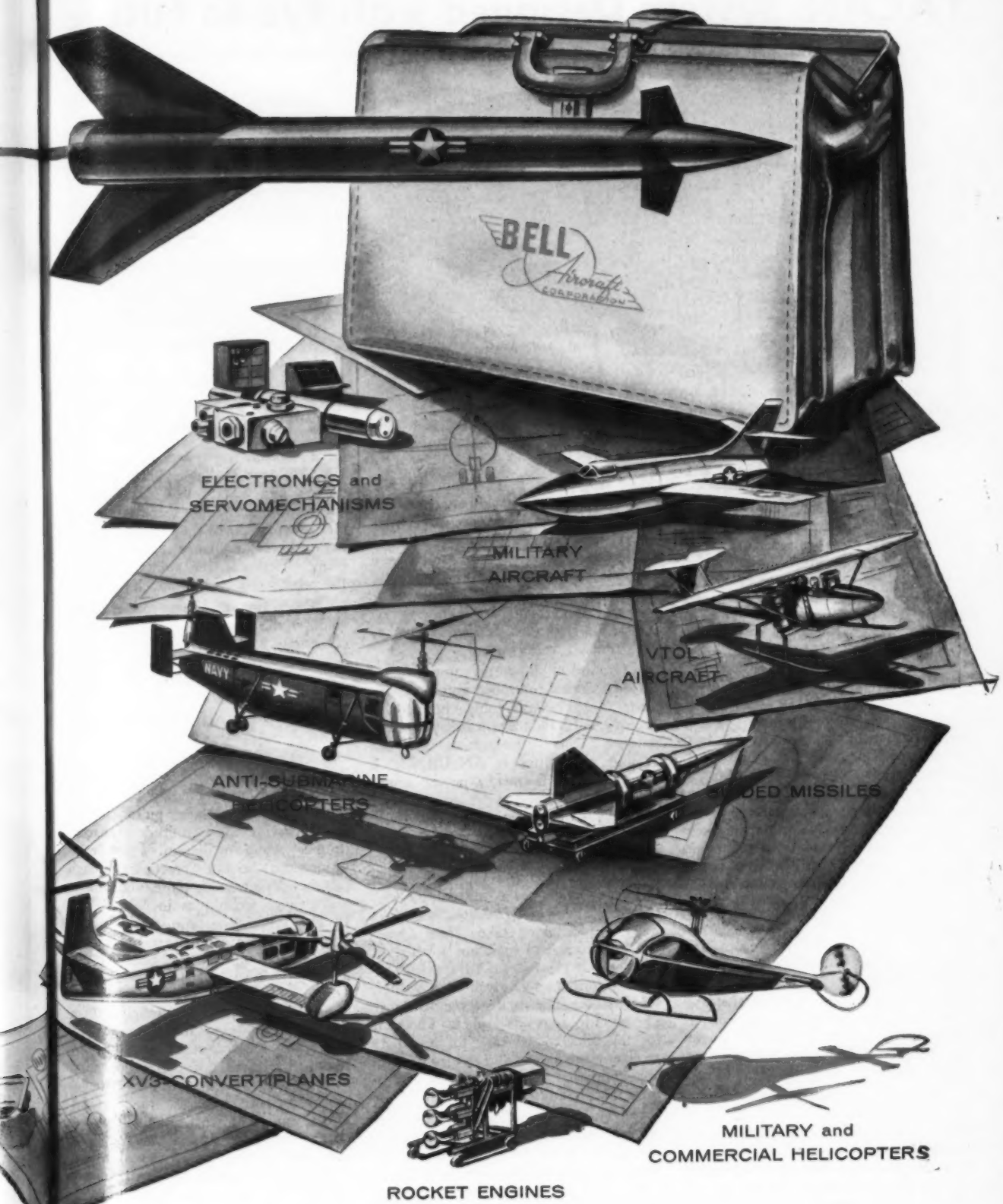


CARRIER LANDING SYSTEM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TACAN: System Designed with Eye to Future

Military and 'private flyer' versions publicly shown; provision made for system expansion.

By HENRY P. STEIER

Whether or not the radio navigation system called TACAN is the correct one for the "common" air navigation system, has the capacity to handle "ultimate" needs, or is even fiscally wise at this time, its novelty as an advanced state of the electronics art is evident in the technical details of its operation.

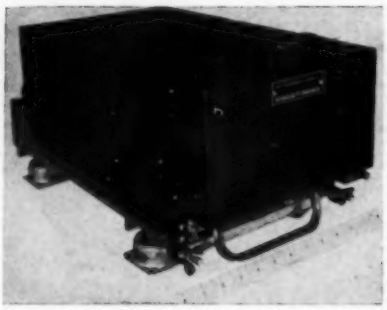
Recent disclosure of TACAN's operating specifications and a public demonstration of working equipment in both military and "private flyer" versions show it to be a system designed with an eye to the future of aviation needs. Basic to it are economy of equipment space and that rapidly diminishing natural resource, the radio spectrum.

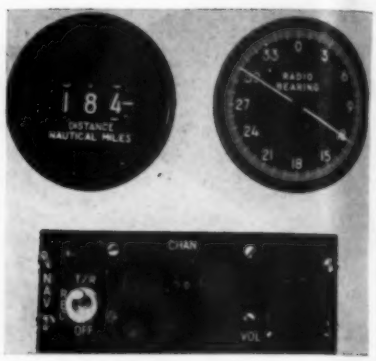
Coupled to these economies is TACAN's "vernier" approach to compass-bearing accuracy that must certainly form a part of any system designed to meet the requirements of an aviation era involving transonic flight, calculating devices more capable than human beings of quickly using high accuracy information for flight control, and the necessity for split-second timing of aircraft movements.

• **Described originally** (AMERICAN AVIATION, June 6, 1955) by its inventors, Federal Telecommunication Laboratories division of the International Telephone and Telegraph Co. as an "integrated" system using one transmitter-receiver to handle a number of different intelligence-carrying channels, the current status of TACAN equipment shows it to be a bearing and distance-measuring system, with circuit design potential for addition of other facilities.

The airborne multi-channel equipment shown publicly is contained in a box that measures 8x10x15 inches, and has the military designation RT-220 (XN-2)/ARN-21. The box contains both the radio-frequency circuits and video or "translator" circuits that convert r-f energy to a form suitable for operating distance and bearing indicators remotely located.

The unit weighs 56 pounds. Seventy-six vacuum tubes are used, many of them of the pinched-base sub-miniature soldered-in type. In the initial production design some attempt at unitizing circuits has been made. There are five plug-in panels containing tubes and circuitry. Collins Radio Co. has a development contract with the Navy to repackage the ARN-21. It plans to use its "modular" plug-in circuit construction with printed wiring to produce a miniaturized version.





Military ARN/21 TACAN airborne equipment and panel meters.

• **Brig. Gen. P. C. Sandretto,** vice president and technical director of FTL, told AMERICAN AVIATION he plans a newly designed package that has all r-f vacuum tube circuits in one box and all video circuits using magnetic amplifiers in another box. This may be the airlines' version to be offered by FTL. The expected combined size of both units is 5x7x9 inches.

Ground or shipborne equipment includes a crystal-controlled receiver-transmitter, video circuits, control box, power supply, and radome-enclosed rotating antenna. Navy designation for the ground transmitter is AN/URN-3. A klystron radio frequency power amplifier, directly crystal-controlled, provides 5 kilowatts peak power. The duty cycle is 2 per cent, so the average power output is 100 watts.

The "private flyer" unit, described in its present state as a "research model," measures about 6x7x12 inches and gives bearing information taken from a control knob tuned to maintain a left-right needle course indicator on center. Distance information is given on a veeder-type counter. The package weighs under 25 pounds, has 33 tubes. Redesign for the pilot model calls for a remote receiver-transmitter and video circuit box connected electronically to instrument panel indicators.

• **The history** of TACAN's development, according to Henri Busignies, executive vice president of FTL, stemmed from development by FTL, in 1946, of a short-range navigation system called Navar.

Busignies said the Air Force in 1947 found a way to increase the accuracy of bearing measurements through use of a multi-lobe omnirange transmission signal. In 1949, the Navy asked for a coordinated system and in 1950 TACAN was available. Then in 1951 the AF and Navy called in the British government for final specifications on the system which they jointly agreed should have 126 channels, freedom from siting effects and the ability to handle 100 aircraft on each channel.

Production of pilot models started in 1953 and now the military aibrorne equipment is in full production by FTL, Stromberg-Carlson Division of General Dynamics and Hoffman Electronics Corp. Farnsworth Electronics Division of IT&T is making the ground equipment.

Unlike the present VOR system, TACAN's omnirange portion works by transmitting intelligence with the aid of amplitude modulated pulses, instead of by varying the amplitude of a continuous wave oscillation. Pulse communication became practical through the development of pulse and microwave radar techniques in World War II. The TACAN technique, which Busignies prefers to call "organized radar," uses pulsed signals for both bearing and DME functions.

• **Just as in radar ranging** techniques, DME used in both TACAN and CAA DME systems measures the round-trip travel time of radio pulses between an aircraft and the ground beacon. In both presently installed CAA DME and TACAN systems the airborne transmitter sends out very narrow interrogating pulses in pairs. The pairs are pre-arranged to have 12 microseconds time between constituent pulses that form the pair. This is done in 126 different radio frequency channels in

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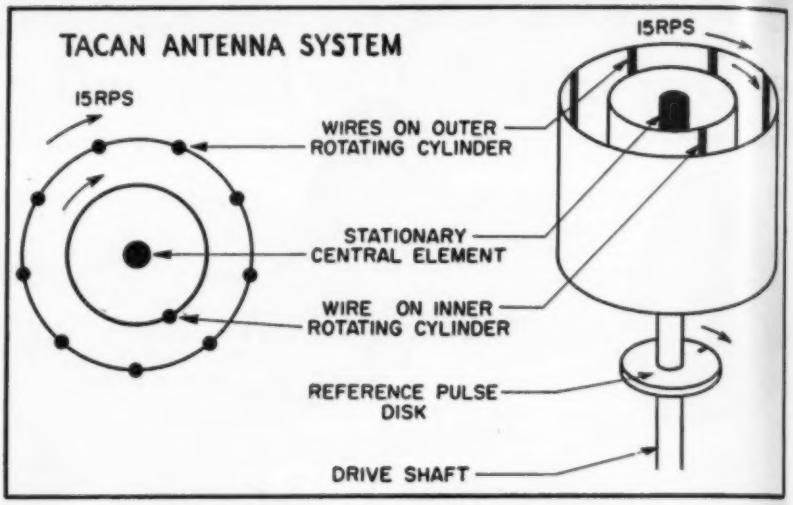
the r. f. band of 1025 to 1150 megacycles for air-to-ground TACAN DME transmission.

The ground beacon transmitter, to which the airborne TACAN is tuned, answers with reply pulses on a different channel than the interrogation pulses. For ground-to-air transmissions there are 63 frequencies in the 960 to 1,025 mc band plus 63 in the 1,150 to 1,215 band.

• **The repetition rate** at which each airplane's pairs of pulses is sent out is randomly "wobbled". A "strobe" or searching circuit investigates all received reply pulses and finds the one series that exactly match the repetition rate of the airplane's initiated pulses. The strobe circuit locks on to the proper series and tracks them as their time delay slowly changes with changes in the airplane's distance from the beacon. Unlike most radar, the transit times measured are not indicated on a cathode ray tube but by a veeder-type indicator reading directly in nautical miles and tenths of a mile.

Wobbling of repetition rates and the paired pulse idea are resorted to so that extraneous sources of r. f. energy or atmospheric noise will not produce false signals. Both ground and airborne receivers use twin pulse decoders set to pass only pairs of pulses with prescribed repetition rates.

The duty cycle during which r. f. energy is being transmitted is very short since pulse pair repetition rates amount to only about a total of 30 per second. With pulse widths of only a few miscroseconds, this means that in DME operation the r. f. channels are "empty" most of the time during each second. Large "time-spaces" amounting to tens-of-thousands of microseconds exist between successive pulse pairs. The system plan is to use these time-spaces for pulses carrying intelligence about additional navigational or operational information such as glide slope marker, etc. This may be done by arranging other pulse pair times to form a code signal transmission system called pulse multiplex.



Federal Telecommunications TACAN antenna system.

At present some of the empty time-spaces are used in TACAN to transmit Morse code station identification signals identifying the station to which an airborne TACAN is tuned. This feature provides an additional safety factor for identifying a station without necessity for checking the tuning control settings.

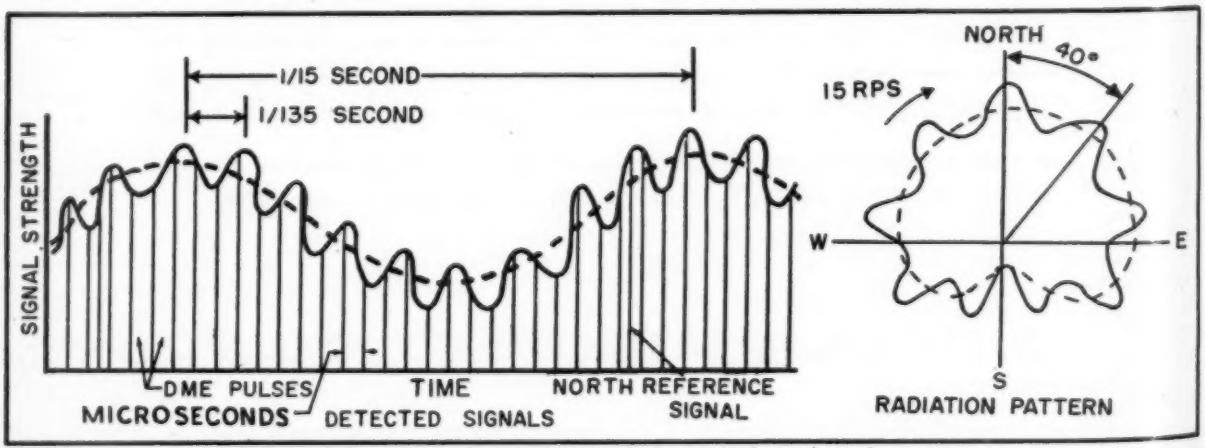
• **Present CAA DME** installations use the 963.5 to 986 mc band divided into 10 channels for interrogation and the 1,188.5 to 1,211.0 mc band divided into 10 channels for reply. By using different interrogation frequencies with different reply frequencies there are 100 possible operating combinations.

Since present DME transmitters are designed to reply only to such interrogations as are received from aircraft, the total power might vary from full, when not answering, to lower values depending upon existing traffic. The existing civil system is said to be able to handle only 50 aircraft before the transmitter power is reduced to the half-power point.

Variation in power drain causes, in general, transmitter frequency instability stability and reduced range reliability. Use of pulse multiplexed replies, depending upon a number of fixed codes as in civil DME sometimes causes "pairing" effects because counts of say 12 and 24 microseconds become mixed, since they are multiples. This gives rise to "fruit" or spurious replies to non-existing interrogations.

In the TACAN design the DME beacons operate on a "constant duty cycle." The transmitter puts out a constant number of pulses amounting in all to about 3,000 per second. If that number is not triggered off because of light traffic, a local source triggers off the excess. This keeps the variations in pulse strength from occurring.

• **When installed,** the TACAN



TACAN signal energy radiation pattern and the received signal envelope pattern.

Here is America's first commercial jet airliner

Above is the Boeing Jet Stratoliner 707 as it will look when it takes to the air. Its prototype—America's first jet transport—has been flying for more than a year. It has completed more than 200 hours of flight test—has repeatedly flown well above 40,000 feet and at speeds above 600 miles per hour.

Boeing has indicated to the commercial airlines that it could deliver jet transports so that flight operations could start early in 1959. Such early delivery is possible because Boeing has the prototype flying now—is already building a military jet tanker-transport generally similar to the 707 Stratoliner—and has accumulated vast experience in producing well over 1,000 B-47 and B-52 multi-jet bombers.

The 707 Stratoliner—a sleek, four-jet swept-wing beauty—will cruise in the 550-mile-per-hour range. It will make possible transcontinental flights in less than five hours; transatlantic in less than seven hours!

Incorporated in the Stratoliner are Boeing's specialized knowledge gained in 20 years of building multi-engine pressurized aircraft, and the full 39 years of the company's experience in the aircraft business.

It is typical of Boeing leadership that the company has designed and built America's first jet transport.

It was this leadership which gave commercial aviation the twin-engine 247, the 314 flying boat, the original pressurized transport Stratoliner 307, and the Stratocruiser; and gave the military the B-17 Flying Fortress, the B-29, the six-jet B-47 and the eight-jet B-52.

BOEING

omnirange antenna facility is covered by a plastic radome that is essentially "transparent" to the radiated energy. Overall, the height of the assembly is about seven feet. It has a diameter of about three and a half feet.

The antenna element system is comprised of a fixed central radiating element around which two cylindrical parasitic, or reflector, elements rotate. The central element, which is a stack of "discone" radiators, is mounted vertically and has a diameter of a few inches. Around the central element is a Fiberglass cylinder in which is imbedded a vertical wire completely isolated electrically. Around this inner cylinder is another, about 33 inches in diameter, in which are imbedded nine wires placed 40 degrees apart. These wires also are isolated electrically.

The co-axial cylinders rotate in unison at 15 revolutions per second, with the wires in both cylinders maintained at a fixed relationship to each other. The effect of the inner cylinder wire is to distort the original circular energy radiation pattern, produced by equal radiation of DME pulse signals from the central element, into a cardioid, or heart-shaped, pattern. The effect of the outer cylinder wires is to distort the cardioid pattern at nine points.

• **The resultant signal strength** radiation pattern is roughly cardioid in shape but distorted at nine points 40 degrees apart to form a composite nine-lobe envelope. Since the cylinders are rotating this pattern is also rotated. Each time the maxima of the lobes sweep past an airplane, the TACAN receiver receives an amplitude-modulated series of pulses that is a composite of a 15 cycles-per-second audio sine wave on which is superimposed a 135 (15x9) cycles-per-second sine wave.

As in the civil VOR system, the electrical phase angle, or position, of the maximum TACAN signal in compass degrees relative to North is used to determine bearing. This requires a reference signal. An aluminum disc bearing a very thin iron slug on its periphery is fastened to the drive shaft of the rotating cylinders. A stationary pick-up coil mounted close to the disc generates a signal inductively each time the iron slug passes it. The slug is in line with the position of the maximum signal strength of the cardioid pattern lobe. The pickup coil is due North from the antenna center.

Thus, with each turn of the cylinder, when the position of maximum signal amplitude is pointing due North, the coil-generated signal triggers the DME transmitter that sends out a specially coded reference pulse. Received by the airplane TACAN, the reference pulse is used as a timing reference for the measurement of phase angle, which in turn is used to determine bearing from North.

• **The "vernier" or "fine" or** measurement of bearing in TACAN uses the 135-cycle sine wave to produce a "magnifying" effect. As an airplane progresses through a 40-degree arc of bearing, the angular width of a minor lobe, the phase angle of the 135-cycle signal moves through one cycle, from minimum to maximum and back to minimum. Thus in each 40 degrees of compass bearing there are 360 phase angle degrees of change for each of the nine minor lobes.

The effect of this phase system within a phase system permits "fine" bearing measurements involving magnified examination of only a portion of the total 360 compass degrees. The "fine" bearing information is available for operating left-right meters, automatic pilots, computers etc. In the present TACAN instrumentation, the 15 cps "coarse" system phase measurement initially moves the bearing pointer to the correct 40-degree bearing sector, but exact positioning within that sector is under control of the 135 cps "fine" system phase measurement.

• **FTL says** its multi-lobe system will accomplish the same percentage reduction in *average* bearing indication errors as it does in *maximum* indication errors, compared to the cardiod system. Hence, according to FTL, the site error improvement with TACAN must be considered from both the point of view of isolated extreme errors, and also from "the more practically important point of view of statistical or average behavior."

When variations in isolated siting cases are considered, such as one at Basra, Iraq, some idea may be gleaned of how extensive siting evaluations may be of necessity before that issue is resolved with statistical accuracy. Wilcox Electric Co. Inc., which manufactured the Basra VOR station, reports a citation from the CAA to the effect that the Basra station has been operating many months with a bearing accuracy of 0.85 degree; an excellent accuracy as VOR is commonly understood. • • •

Electronic Technical Literature

Power Supplies: Full characteristics and circuits of high capacity regulators, AC and DC power supplies, and airborne frequency changers are provided by Sorensen in a new catalog (#254) and borchure (MVR-1).

Bell Transistor Sets Record in UHF Range

GERMANIUM DEVICE in Bell Laboratories' 1,000-megacycle transistor is held between four posts by means of tiny gold wire.

A new record for high-frequency operation of transistors has been achieved by Bell Telephone Laboratories with a tetrode (four-element) transistor that performs well in the ultra-high frequency range.

Known technically as the n-p-n junction transistor, the device has been made to perform at more than 1,000 megacycles. Refinements in manufacturing techniques now permit a ten-fold reduction in the width of the central positive germanium layer in the "sandwich" formed by the three germanium layers of the conventional transistor. In the 1,000 mc units this layer is made two ten-thousandths of an inch wide. The width affects the high frequency performance of transistors.

Recently, the General Electric Co. succeeded in obtaining oscillating frequencies up to 300 mc from tetrode transistors, and a usable gain up to 150 mc. Bell has given no information on the usable gain frequency of its 1,000 mc transistor.

Certain types of radar, communications and air navigation devices should benefit from use of the new transistors when they are available. Production by Western Electric Co., scheduled this year, will go to defense needs.

Automation Reduces Force

Some statistics of automation in the electronics field, recently revealed in a report prepared by the Stamford Research Institute, showed that in a typical case of a six-tube chassis made with one of the currently proposed automation techniques, the number of employes required to produce a typical production quantity of the chassis would be reduced from 12,000 to 4,000.

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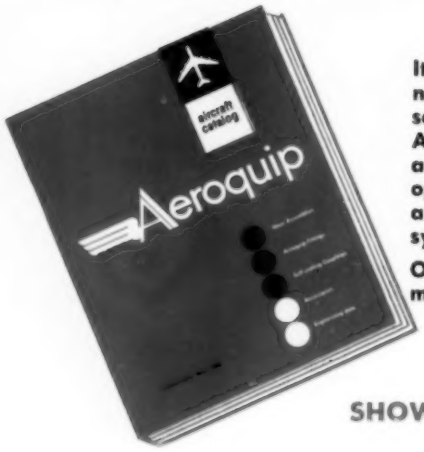

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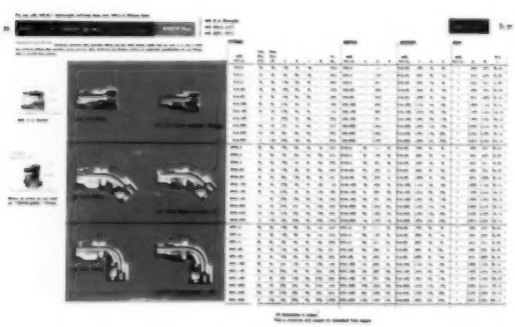
in section a

There are 34 pages packed with information about Aeroquip AN-MS and new lightweight hose assemblies for all pressure ranges and aircraft fluid systems, complete part number information on Aeroquip elbow hose assemblies, fittings, assembly instructions, and ordering instructions.



in section b

18 pages describe fully Aeroquip hose fittings and components. Included are standard flange and swivel nut types. Also given are tube bend data for elbow assemblies, ordering information, and special fittings data.

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Complete Hose Line and Coupling Information

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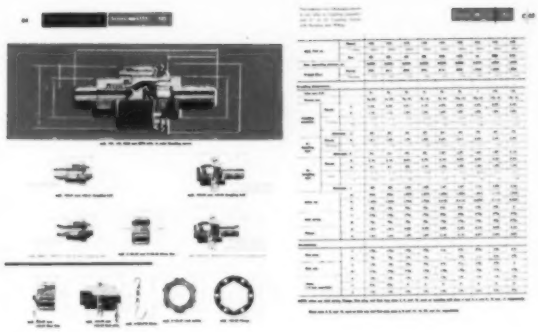
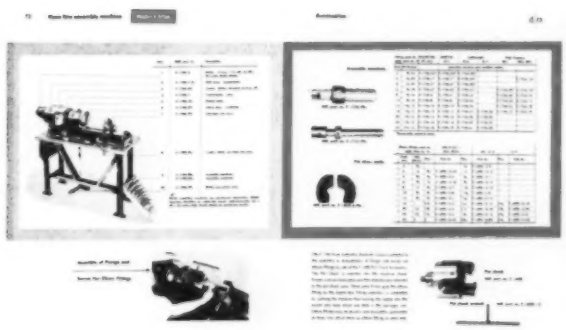
You'll find information on Aeroquip Self-Sealing Couplings for all commonly used aircraft fluids. Installation instructions are complete and well illustrated. Included are pressure loss characteristics and ordering instructions.



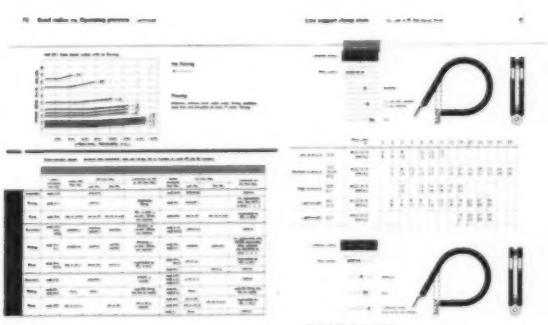
in section d

There is useful information on tools for hand assembly of Aeroquip hose lines, "O" ring proof-test adapters, hose cut-off machine, hose line assembly machine and accessories, and the Aeroquip Hydrauliscope.



in section e

You'll find important engineering data to help you in the selection of hose and planning installations, bend radii vs. operating pressures, conversion charts giving latest MS and MIL numbers, support clamp sizes, and more.



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New Products and Processes

AIRCRAFT DOLLY

The Cam Aircraft "Y" Dolly, developed by Cam Tool Co., enables one mechanic to mount, demount and truck aircraft landing wheels faster and easier than with heavier types of equipment.

When used in the assembly of either tires or brake-drums, the dolly eliminates much of the strain in handling wheels. Its T-handle gives good control of the load. A screw jack lifts and lowers 40 to 56-in. tire and brake assemblies, while hinged front rollers assume the angle of the axle on the jack and line up for mounting.

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PRESSURE REGULATOR VALVE

An absolute pressure regulator valve that handles flows up to 40 cfm has been added to Century Controls Corp.'s line of pneumatic controls.

This valve can be placed on any jet bleed line to air turbine power packs, compartment pressurization and cooling systems, or fuel tank pressurization and relief systems. According to the maker, it maintains constant pressure at inlet temperatures as high as 550°F.

Circle No. 102 on Reader Service Card

PORTABLE LAMPS

Two new units have been added to the line of portable fluorescent lamps made by Day-Ray Products, Inc.

Lamps of 15 and 30 watts were introduced following surveys of users' needs. In the aircraft industries it was found that more light was needed to cover larger areas, as compartments and sections of planes have become larger.

Cheli Air Force Base at Maywood, Calif., uses 30-watt steel-guard units to provide adequate lighting within and between storage bins. Flashlights, previously used, were more expensive and less efficient, it is said.

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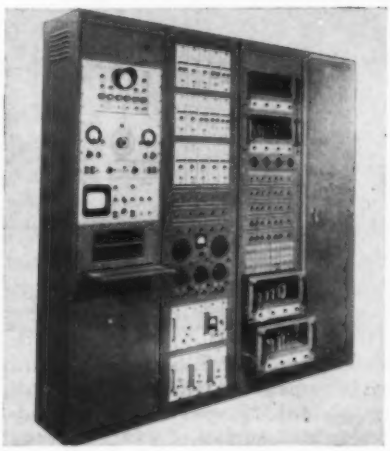
COMPUTER COMPONENTS



Servo Corp. of America offers a selection of electro-mechanical analog computer components for such purposes as production control, problem-solving, experiment and data processing.

Called Servomation Building Blocks, these standardized interchangeable modular assemblies match each other in all important mechanical and electronic specifications, according to the manufacturer. When intended for a specific task, the desired units may be specially packaged to meet the demands of limited space or restricting ambients.

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NEW PRODUCTS

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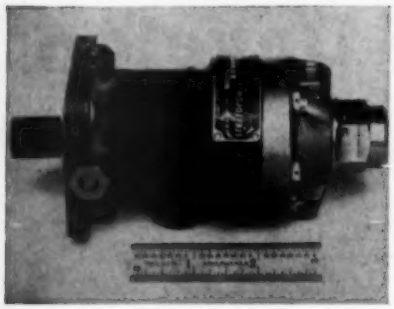
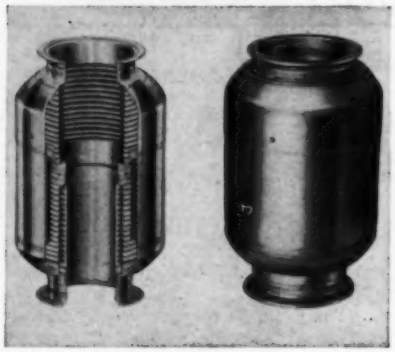


A new series of 10,000 rpm piston-type hydraulic pumps, smaller and lighter than previous models, has been developed by New York Air Brake Co.'s Stratopower Section.

Series 65 pumps, as they have been designated, were designed primarily to meet high performance demands and extreme space limitations of modern military aircraft and missile applications. The 0.5 gals. per min. constant delivery pump weighs only 31 oz. Weights of the other sizes are correspondingly low.

Circle No. 100 on Reader Service Card

PRESSURE COMPENSATOR



Arrowhead Rubber Co., Metal Products Division, has developed a pressure compensator for balancing the end thrust or "pressure growth" of a pneumatic metal ducting system. It is said to be particularly applicable to bleed air systems in turbojet and turbo-prop-powered aircraft.

By balancing the tension and removing the end load of the duct system, this bellows unit eliminates the need for heavy structural bracing. The primary bellows provides for thermal expansion, flexure and misalignment of the duct system.

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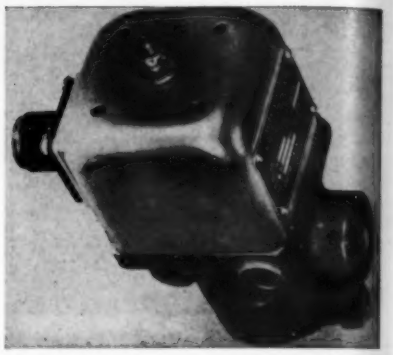
Designated 5BBY13DJ7, the motor draws maximum armature current of 0.8 amps. from a 28-volt line.

Circle No. 109 on Reader Service Card

SHUT-OFF VALVE



A new solenoid-operated shut-off valve said to have some much-needed features is now being supplied by Mar Vista Engineering Co.

Designated Model 21, this valve has low current drain, fast action and an operating range of 0 to 5,000 psi. Temperature range is —65° to 275°F, flow rates from 0 to 10 gpm. Overall dimensions are 4.67″ x 2.03″ x 3.5″.

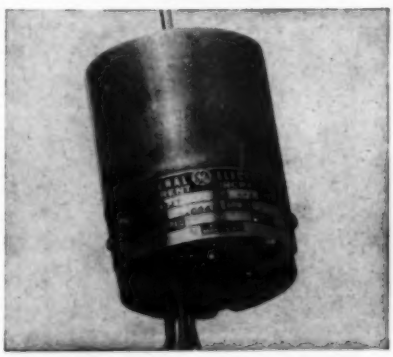
Circle No. 106 on Reader Service Card

Burns crew seats go up or down ... tilt, or even move sideways. We seat the VIPs, too. For up-to-the-minute aircraft seats—military, airline, or executive—send for Burns... Designer and manufacturer for national and international airlines and most of the NBAA Fleet. Write, wire or phone for further information.

BURNS AERO SEAT CO.
3900 COHASSET STREET
BURBANK, CALIFORNIA
BURNS

Circle No. 20 on Reader Service Card.

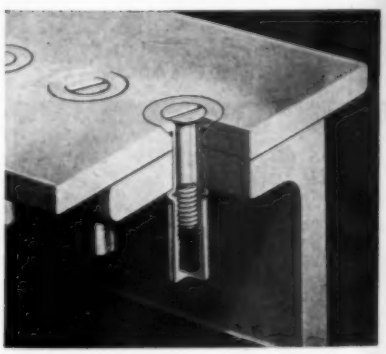
SERVO MOTOR



A miniature dc servo motor said to be capable of withstanding a potential of 1,500 volts and of responding to field currents of 0.0075 amperes, has been announced by General Electric Co.'s Specialty Component Motor Department.

Weighing less than 8 oz., this tiny motor is suited for aircraft applications on blowers, actuators, tuners and similar devices. According to the manufacturer, it will operate equally well at sea level or at 50,000 ft. altitude and within temperature limits of —65° to 165°F. It may also be used as a prime mover in gun direction computer systems and electronic devices, and it can be modified for other aircraft and missile applications.

BLIND RIVET



The B. F. Goodrich Co., working with the Grumman Aircraft Engineering Corp., has developed a new type of "Rivnut," a one-piece blind rivet approved for primary aircraft structures.

In the Navy's Grumman F11F-1 Tiger, top and bottom aluminum sections that form each wing also double as fuel tank walls, through use of the new Rivnut, which has been called the "Seal-Head" with a rubber "O" ring.

The Seal-Head Rivnut is installed in a hole that has been drilled and countersunk in the wing sections. It is said to be able to hold the sections together tightly enough to withstand the strains of supersonic flight and to prevent loss of fuel.

B. F. Goodrich makes a line of

The Plus Factor

The above photograph shows the area of damage in the right wing of a BEECHCRAFT Twin-Bonanza, caused by a mid-air collision.

The Twin-Bonanza, with six people aboard, was struck by the top of the tail of a military jet airplane which inadvertently was brought too close by its pilot while making a night inspection. The jet airplane came past from behind the BEECHCRAFT and knocked this hole in the flap and trailing edge of the wing. The top of the jet's tail was knocked off and was left inside the wing.

The BEECHCRAFT retained its usual good flight characteristics and was landed without further incident.

All BEECHCRAFTS are built with additional margins of strength beyond those required by Government regulations. This *plus factor* reduces maintenance expense and increases the ability of BEECHCRAFTS to withstand unusual conditions.

The Beechcraft L-23B is the largest fixed-wing airplane flown by the U. S. Army Ground Forces. A civilian version, the famous Beechcraft Twin-Bonanza, is a popular member of The Air Fleet of American Business.

Beechcraft

Beech Aircraft Corporation, Wichita, Kansas, U. S. A.

Beech builds: USAF T-34 • USNavy T-34 • USArmy L-23 • USAF C-45 • Model 35 Bonanza • Model 50 Twin-Bonanza • Super 18 Executive Transport

NAVY'S NEWEST JET

NEWEST SUPERSONIC FIGHTER, the Navy's Chance Vought XF8U-1, is a slender, sweptwing aircraft designed for air superiority missions in areas of sea operations. Throughout, the XF8U-1 is characterized by its uncluttered design and simple structure. It was built to take full advantage of the tremendous thrust of its Pratt & Whitney Aircraft J-57 turbojet engine.

PRATT & WHITNEY AIRCRAFT
DEPENDABLE ENGINES

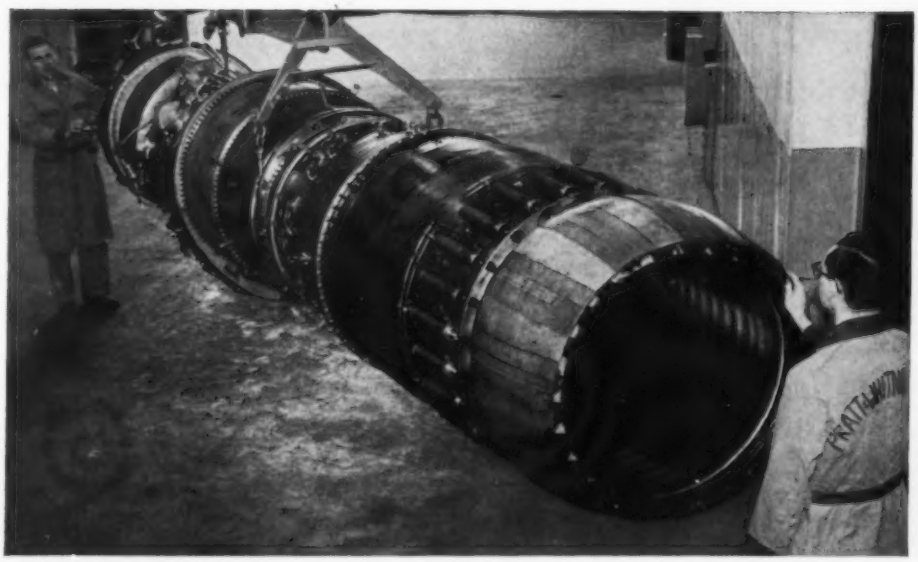
ONE OF THE DIVISIONS OF
UNITED AIRCRAFT CORPORATION

POWERED BY THE J-57

A new supersonic jet fighter, the sleek Chance Vought XF8U-1, is now being test flown for the Navy. Like four other Navy and Air Force fighters, all faster than sound, it is powered by Pratt & Whitney Aircraft's big J-57 turbojet engine.

In the XF8U-1, an efficient J-57 power plant is combined with a trim, lightweight airframe to produce an advanced aircraft capable of supersonic speed, high rate of climb and exceptional ceiling. Demonstrated fuel economy of the J-57 promises, as well, the long endurance required in carrier operations.

The new Chance Vought aircraft is designed as a carrier-based day fighter, to control the air in areas of sea operations. Again, in this important addition to the Navy's air strength, the Pratt & Whitney Aircraft J-57 turbojet engine continues to make its vital contribution to American Air Power.



AN EFFICIENT J-57 with afterburner, like that above, develops well over 10,000 pounds of thrust for Chance Vought Aircraft's new XF8U-1. In a trim, lightweight aircraft, this proved, high-thrust engine provides power to meet specifications for high rate of climb, exceptional combat ceiling, and supersonic speed.

Pratt & Whitney Aircraft

MAIN OFFICE AND PLANT: EAST HARTFORD, CONNECTICUT • BRANCH PLANTS: NORTH HAVEN, SOUTHINGTON, MERIDEN
In Canada: Canadian Pratt & Whitney Aircraft Co., Ltd.

NEW PRODUCTS

Rivnuts from No. 4s up to and including the ½-in. size, in steel, brass, stainless steel and aluminum.

Circle No. 141 on Reader Service Card.

IN-CIRCUIT TESTER

Simpson Electric Co. has developed an in-circuit capacitor leakage tester, said to be the first such instrument produced. The tester, designated Model 383, tests capacitors for leakage, breakdowns, shorts and intermittent operation while they are still in the circuit. Checking at full rated voltage, the unit operates on the principle that leakage resistance is inherently non-linear, unstable and changeable. Capacitors ranging from 1 $\mu\mu$f to 0.25 μf can be tested.

Circle No. 142 on Reader Service Card.

KLYSTRON POWER SUPPLY

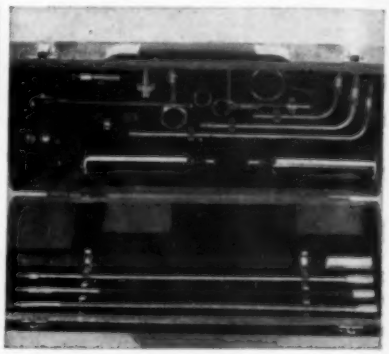
A source of power and modulation for low and medium voltage klystron tubes is available from Polytechnic Research and Development Co., Inc. It provides beam voltages from 250 to 600 volts at 65 ma, reflector voltages from 0 to —900 volts at 50 μa, square wave modulation from 400 to 2000 cps and sawtooth modulation at line frequency. The unit is said to permit easy changing from cw to square wave modulation for peak power measurements.

Circle No. 143 on Reader Service Card.

ILLUMINATOR INSPECTION KIT

The Magnaprobe Illuminator inspection kit, developed by the Magnaprobe Division of Engineering Developments, Inc., consists of a number of small, low-voltage electric light bulbs fitted at the end of rigid or flexible metal instruments.

These probes are designed for interior illumination and inspection of blind or hidden areas in bores, cavities, complex assemblies, etc. in aircraft, industrial and marine equipment. An extensive range of probes and bulbs are available, from 7/64 in. diameter. Two standard dry cell batteries provide the 2.5-volt power supply.



Circle No. 144 on Reader Service Card.

ELAPSED-TIME CHRONOGRAPH

New eight-day elapsed-time aircraft clocks are being produced by Wakmann Watch Co. for the U. S. Air Force under a prime contract. They are also being installed as standard equipment on many of the new Douglas DC-7s being delivered to airlines throughout the world, according to the manufacturer.

The chronograph clocks are made with either a 12- or 24-hour dial, center sweep hand and hour register hands. Designated Model A-10-4, the clocks

"We've got royalty aboard every

Golden DC-7 Crown flight"

passengers wear the crown between —

CHICAGO • ATLANTA • MIAMI
HOUSTON • ST. LOUIS • CHICAGO
MIAMI • JACKSONVILLE • CINCINNATI
DALLAS • NEW ORLEANS • ATLANTA
CHICAGO • NEW ORLEANS • CARIBBEAN
MIAMI • DALLAS • LOS ANGELES*

*Delta-C&S-National-American Interchange.

Delta-C&S AIR LINES

General Offices: Atlanta Airport, Atlanta, Ga.

WORLD'S PREMIER AIRPLANE FABRIC

lighter — stronger — smoother

FLIGHTEX

FLIGHTEX FABRICS, Inc. • 93 WORTH STREET • NEW YORK 13, N. Y.

Leading Manufacturers of Fabric and Tapes for the Aircraft Industry

FLIGHTEX FABRIC

Export Representative AVIQUIPCO, Inc. 25 Beaver Street N. Y. Cable Aviquipco

Circle No. 21 on Reader Service Card.

NORTH AMERICAN HAS BUILT MORE AIRPLANES THAN ANY OTHER COMPANY IN THE WORLD

NATO's KO PUNCH

That's the new "K"...F-86K SABRE JET... North American's latest, potent addition to the Free World's air arsenal. The first and only one-man, all-weather interceptor designed specifically for our NATO allies, cannon-armed "K" is an ideal improvement on the world-famous SABRE JET Series.

The new North American designed and built MG-4 fire control system in the "K" tells the pilot in any weather where his target is and when to fire, and is a valuable navigational aid. And, like the F-86 SABRE JET, "K" is over 650 mph fast, is equipped with North American's all-flying tail, proven de-icing system and parabrake.

Now in production both at North American's Los Angeles Plant and at the Fiat Works in Italy, the F-86K SABRE JET is slated for early service...will soon form a miles-high wall against aggression.

The "K" is another example of the kind of research and development that keeps North American foremost in aircraft, rocket engines, guided missiles, electronics and peaceful applications of atomic energy.

Engineers: North American offers unusual opportunities. Write Engineering Personnel Office, Los Angeles or Downey, California; or Columbus, Ohio.

ENGINEERING AHEAD FOR A BETTER TOMORROW

NORTH AMERICAN AVIATION, INC.

DME NEWS FROM narco

MOHAWK AIRLINES ADDS NARCO DME

First Airline to Use Distance Measuring Equipment for Added Safety and Expedited Approaches

Fleet-wide installation of Narco DME (Distance Measuring Equipment) is now under way by Mohawk Airlines serving New York and New England.

First installations have been completed in Mohawk's new fleet of Convairliners with the DME installation scheduled to follow in the company's ten DC-3's.

Addition of Narco DME in the Mohawk fleet marks the first use by a scheduled airline of this latest navigation aid which gives the pilot exact distance information from a VOR or ILS site.

The Narco DME gives this information on two scales — 0 to 20 miles for close-in approach work and 0-200 miles for en route navigation.

Use of DME by Mohawk is expected to effect considerable economies by permitting expedited IFR approaches.

DME Network in Wide Operation

DME coverage on all major airways plus installation at key ILS sites is in current everyday operation. CAA appropriations cover continued operation of the system throughout the nation. CAA has recently announced new procedures using DME which eliminate much of the time-consuming procedures now necessary.

Executive Pilot Praises DME

E. R. Morris, Executive Pilot for G. T. Pew (left), Board Chairman for Aero Design and Engineering Co., manufacturers of the Aero Commander, has flown 700 hours with Narco DME during the past year and a quarter.

"I wouldn't want to be without it," is Mr. Morris' summation of DME. "For instance, when you're flying a holding pattern, DME makes it so much easier.

"Expedited approaches on instruments are another big advantage of DME. Because we can tell the tower exactly where we are anytime, we often get straight-in clearance almost as if VFR.

"DME also lets us make instrument approaches to many out of the way airports, just as though they had ILS.

"There's nothing finer than DME for night flying in strange country, in marginal, semi-instrument weather or around thunder storms. You know exactly where you are."

For more information on Narco DME see your Narco distributor or write for brochure on DME, fully type certificated for airline use.

narco
NATIONAL AERONAUTICAL CORPORATION

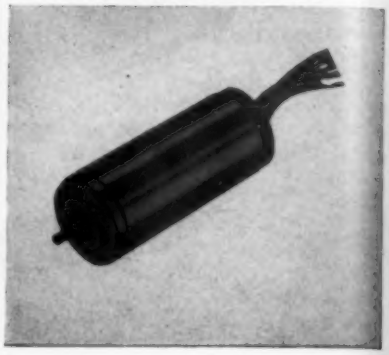
Circle No. 22 on Reader Service Card.

NEW PRODUCTS

are manufactured according to MIL-C-9196 and 10400 USAF specifications to fit standard panel openings.

Circle No. 145 on Reader Service Card.

MOTOR-GENERATOR



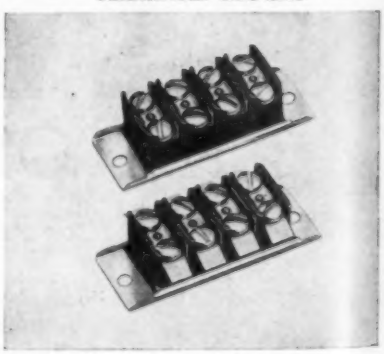
Production of a Size 11 motor-generator has been announced by G-M Laboratories, Inc.

The motor normally is designed for operation on 115 volts, 400 cycles, but can be wound for other voltages on either phase if desired. It has a 0.6 oz. in. stall torque and a no-load speed of 5,200 rpm. The generator, normally wound for 115-volt, 400-cycle excitation, has an output of 0.5 volt per thousand rpm.

The unit, housed in stainless steel, is 1 1/16 in. in diameter and 2 17/32 in. long.

Circle No. 146 on Reader Service Card.

TERMINAL BLOCKS



Curtiss Development & Mfg. Co. offers a new series of terminal blocks, designated Type MA and Type MAT, designed to meet many Underwriters' Laboratories' standards.

Exceptionally compact, with only ½ in. center-to-center spacing of terminals, the blocks provide ⅜ in. creepage distance between terminals and to ground. Other features: #8-32 brass screws; 16-gauge (.051) brass terminal bars; 26-gauge (.018) x 1⅜ in. wide steel base channel. They are rated at 300 volts,

HELICOPTER INSTRUMENTS AND CONTROLS DEMAND SPECIAL DEVELOPMENT

... they've been getting it at Sperry's Flight Research Center, MacArthur Field

▪ One aircraft of the fleet in Sperry's flight research program is the Sikorsky S-55 you see above. This flying laboratory is completely equipped with the latest in helicopter instruments and controls. It is flown by Sperry test pilots, and its crew consists of Sperry engineers who note and record the performance of the instruments and controls under all flying conditions.

▪ As a result of over 10 years' constant flight research in this field, Sperry has now perfected a new flight control system which gives precise automatic stabilization and control of helicopters even under the most exacting condition of hovering. In addition to providing precise control, a new automatic stabilization system relieves the pilot of constant, fatiguing manual manipulations.

▪ A helicopter integrated instrument system including a flight director has been developed—and, also, a new engine rpm control.

▪ Write our Aeronautical Equipment Division concerning your helicopter instrumentation and control requirements.

SPERRY GYROSCOPE COMPANY
Great Neck, New York
DIVISION OF SPERRY RAND CORPORATION

Circle No. 23 on Reader Service Card.

DISCOVER A NEW HIGH IN AIR TRAVEL...

TWA's great fleet of SUPER-G CONSTELLATIONS

QUIETEST, MOST LUXURIOUS, LONG-RANGE AIRLINERS IN THE WORLD!

MEET FELLOW PASSENGERS in the fashionably decorated "Starlight Lounge." Relax in deep-cushioned sofas. Drinks available on most flights—no charge on TWA's Ambassadors.

Created by Lockheed especially for TWA!

Powered by Turbo-compound engines!

Interior by Henry Dreyfuss, world-famous designer!

See for yourself why experienced air travelers are saying TWA's new Super-G Constellations are the finest in the skies!

As you stroll through the spacious cabins, you'll see the widest, roomiest lounge chairs in any U.S. airliner; glare-free picture windows; rich wood-paneled interiors ...much, much more. Mealtime finds you lingering over each tempting course of a complete de luxe dinner. Between meals enjoy delicious snacks or tempting canapés from TWA's galley. And all this is yours at no extra cost!

Plan to enjoy this luxury on your next trip. Fly TWA's Super-G Constellations non-stop coast to coast, non-stop between major U.S. cities, and beginning November 1, 1955, non-stop to Europe. For immediate reservations, see your TWA travel agent or call TWA, Trans World Airlines.

Fly the finest... **FLY TWA**

TRANS WORLD AIRLINES

U.S.A.·EUROPE·AFRICA·ASIA

The modern, attractive Hertz counter above, located at the Omaha, Neb., Municipal Airport, is Hertz' latest addition to its long list of airport rent a car offices. This new office, like other new Hertz airport offices being installed all over the world, is helping to bring you new passenger revenue. And here's how it's being done!

Hertz originated the Plane-Auto Travel Plan. Because of it, many travelers no longer drive from city to city just to have their car at their destination. Instead, they fly in speed and comfort—rent a Hertz car on arrival. And they're assured of a clean, new Ford Fordomatic or other fine car wherever they go. That's because Hertz serves them at more airports and more cities than any other rent a car system. In fact, there are nearly 900 Hertz offices in over 550 cities throughout the United States and most foreign countries.

To tell your passengers of the Plane-Auto Travel Plan, Hertz spends over $1,000,000 a year for advertisements in national magazines. No other company spends nearly as much to promote the Plan. Neither can any other company offer your passengers 10,700 clean, new cars . . . and more than 30 years' experience in courteous rent a car service.

Hertz also assures you of steady Plane-Auto Travel Plan business because more than 1,500,000 qualified persons now hold Hertz Charge Cards and Courtesy Cards. Hertz also honors Air Travel Cards.

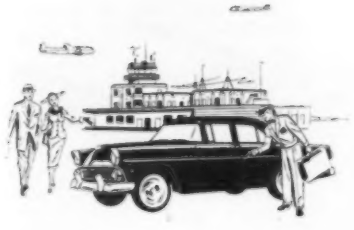
How you can help sell the Hertz Plane-Auto Travel Plan

Promote the Hertz Plane-Auto Travel Plan in all your advertising, displays, folders and any other advertising and promotional programs. And best of all: *urge your ticket sellers and reservation clerks to ask your passengers this simple question:* **"May I reserve a Hertz car for you at your destination?"**

Hertz opens new office at the

OMAHA, NEB.

Municipal Airport



Hertz, already at most major airports everywhere, expands again to bring airlines NEW PASSENGER REVENUE.

For complete information about the Plan, write:

HERTZ *Rent A Car* **SYSTEM**

Department C95, 218 S. Wabash Ave., Chicago 4, Ill., Phone: WEbster 9-5165

25 amperes. The design provides from one to 24 terminals per block.

Circle No. 147 on Reader Service Card.

THERMAL SWITCH

A heremetically sealed thermal switch being made by Control Products, Inc. uses a bimetal element.

Designed for mounting on flat surfaces such as aircraft heaters, or whereever skin temperature control is desired, the switch has an electrical rating of 115 volts ac, 2 amperes resistive. Its environmental temperature range is from —65°F to 800°F. Calibration range is from —20°F to 600°F.

Hermetically sealed in a stainless steel case, the switch is suitable for high altitude work.

Circle No. 148 on Reader Service Card.

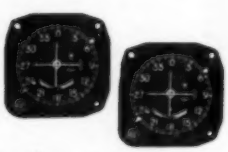
PANEL SEAL

A new panel seal for toggle switches, made of an elastic member cemented to a threaded metal insert, is being produced by Panseal, Inc. The elastic member is of silicone base rubber, configurated to grip the toggle lever firmly, yet allow its full movement. The metal insert is of stainless steel.

The seal also acts as a locknut in securing the toggle switch to the panel. According to the maker, it exceeds the requirements of Mil. Spec. B-5423 in sealing out water, dust, moisture, explosive or combustile liquids, vapors and gases, and in resisting ozone attack.

Circle No. 149 on Reader Service Card.

two can do it better...



and so can dual omni!

Two on the job make any mission *twice* as easy . . . just as dual ARC Omni installations double efficiency, ease and confidence in navigation. With dual omni 15D equipment, a single pilot can make a fix *faster* . . . he can fly any omni track while also cross-checking for position. It's easier to make transition from omni to runway localizers.

With two pilots, the work can be shared for greater ease, by using both omni instruments simultaneously for different jobs.

ARC 15D Omni is compact, lightweight, CAA certified, and now employs new course indicator which combines course selector and cross-pointer meter in a single space-saving unit.

Lighten the load with ARC DUAL omni. Specification data sent on request.

Dependable Airborne Electronic Equipment Since 1928

Aircraft Radio Corporation

BOONTON, NEW JERSEY

Omni Receivers • UHF and VHF Receivers and Transmitters • LF Receivers and Loop Direction Finders • 10-Channel Isolation Amplifiers • 8-Watt Audio Amplifiers • 900-2100 Mc Signal Generators

Circle No. 24 on Reader Service Card.

TIME DELAY RELAY

A new time delay relay developed by the A'G'A' Division, Elastic Stop Nut Corporation of America, permits an electrical interlock by means of instant-action auxiliary switch.

The Model NEL Agastat measures 2¼ in. wide, 3⅜ in. deep and 4½ in. high. Its time delay is pneumatically controlled and provides an accurate timing interval from 0.1 seconds to 10 or more minutes.

The relay is available for all ac and dc voltages, in six different models. It has a 15-ampere rating at 115 volts, 60-cycles ac.

Circle No. 180 on Reader Service Card.

PRESSURE TRANSMITTER

A new high-vibration version of its 45154 Series pressure transmitter has been announced by the Airborne Instrument Division of G. M. Giannini & Co.

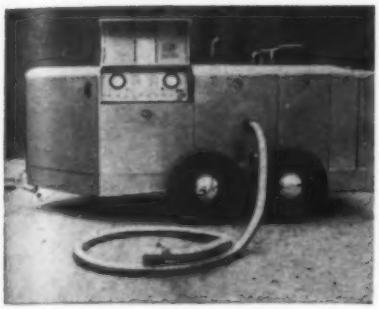
Designated the Model 45154S, the ruggedized unit has been designed to meet all performance requirements while subject to a sinusoidal vibration of 25g at frequencies up to 2,000 cps.

It is available in pressure ranges up to 0-20 psi, absolute, differential or gauge.

The transmitter measures 2⅓ in. long and 1¾ in. in diameter, weighing less than 6 oz.

Circle No. 178 on Reader Service Card.

AIR COMPRESSOR



A two-engine, two-stage air compressor designed for ground support of jet aircraft using turbine starters has been developed by the Highland Engineering Co.

The 300 hp Highland compressor provides air for checkout as well as starting. It will supply up to 150 lbs. 1 min. at 50 psia and 500°F. According to the manufacturer, it also has proved highly efficient for supercharging cabins and cooling radar.

Circle No. 179 on Reader Service Card.

OIL SEAL PULLER SET

A patented set of oil seal pullers, originally designed for the armed forces, is now being produced commercially by the Patton Manufacturing Co.

The set consists of two hammers and 20 expanding heads, which may be purchased separately according to the sizes needed, or as a complete set in a tool box. The standard set removes all sizes of oil seals from 7/16 in. to 4 1/16 ins. Special sizes may be ordered.

Circle No. 181 on Reader Service Card.

SUB-MINIATURE POTENTIOMETER

Ace Electronics Associates offer the No. 500 Acepot, a sub-miniature, wire-wound potentiometer, ½ in. in diameter, in special ganged control units of high precision.

According to the maker, these potentiometers, which are available in the resistance range from 200 to 100,000 ohms, have the accuracy required by many computer and servo control applications. Standard accuracy of linear units is ±0.3% independent linearity. Standard torque is .035 oz./in at 20 C.

Circle No. 160 on Reader Service Card.

LIGHTWEIGHT AMPLIFIER

Production delivery of a new 8-watt audio amplifier designed to power one or more aircraft cockpit loudspeakers has been announced by Aircraft Radio Corp. The ARC F-13 amplifier weighs 5.9 pounds complete with dynamotor.

Circle No. 182 on Reader Service Card.

AIRCRAFT FASTENERS

New all-steel aircraft panel fastener introduced by Scovill Manufacturing Co. conforms to Spec. MIL-F-5591A for "Style 3" applications and is said to be lighter and less expensive than other fasteners in this category.

Features of the new design include hardened studs and grommets for increased durability.

Circle No. 183 on Reader Service Card.

STAY IN THE GROOVE-

with ARC's NEW CD-1 Course Director

Now it's easy to keep a straight, true course wherever you fly...make sure ILS approaches, maintain OMNI tracks with certainty. ARC's new Course Director automatically directs the pilot to the correct headings required for effectively intercepting and making good a desired track. Heart of the system, the Compass Slaved Directional Gyro, gives constantly corrected directional information. The ARC Course Director system is accurate to one degree. Computer portion of the system combines directional and track information obtained from the Localizer/OMNI Receiver and makes computations to provide the pilot with correct heading to intercept and/or make good a desired track and compensates for cross-wind. It relieves the pilot of 90% of his mental effort, helps prevent missed ILS approaches, saves time, effort and fuel, contributes to greater safety. Ask your dealer for complete information.

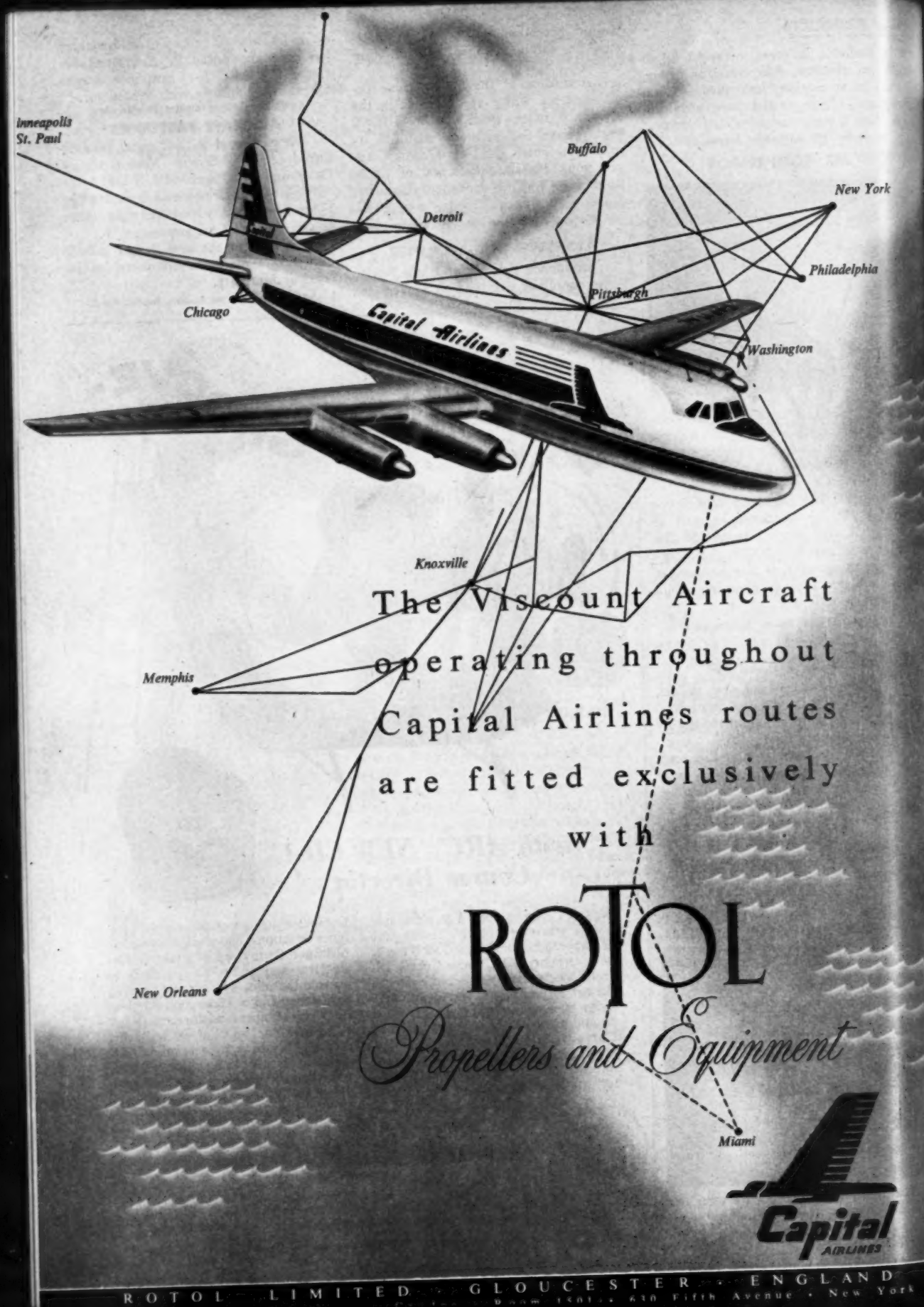
Dependable Airborne Electronic Equipment Since 1928

Aircraft Radio Corporation

BOONTON, NEW JERSEY

Omni Receivers • 900-2100 Mc Signal Generators • UHF and VHF Receivers and Transmitters • 8-Watt Audio Amplifiers • 10-Channel Isolation Amplifiers • LF Receivers and Loop Direction Finders

Circle No. 25 on Reader Service Card.



The Viscount Aircraft operating throughout Capital Airlines routes are fitted exclusively with

ROTOL

Propellers and Equipment

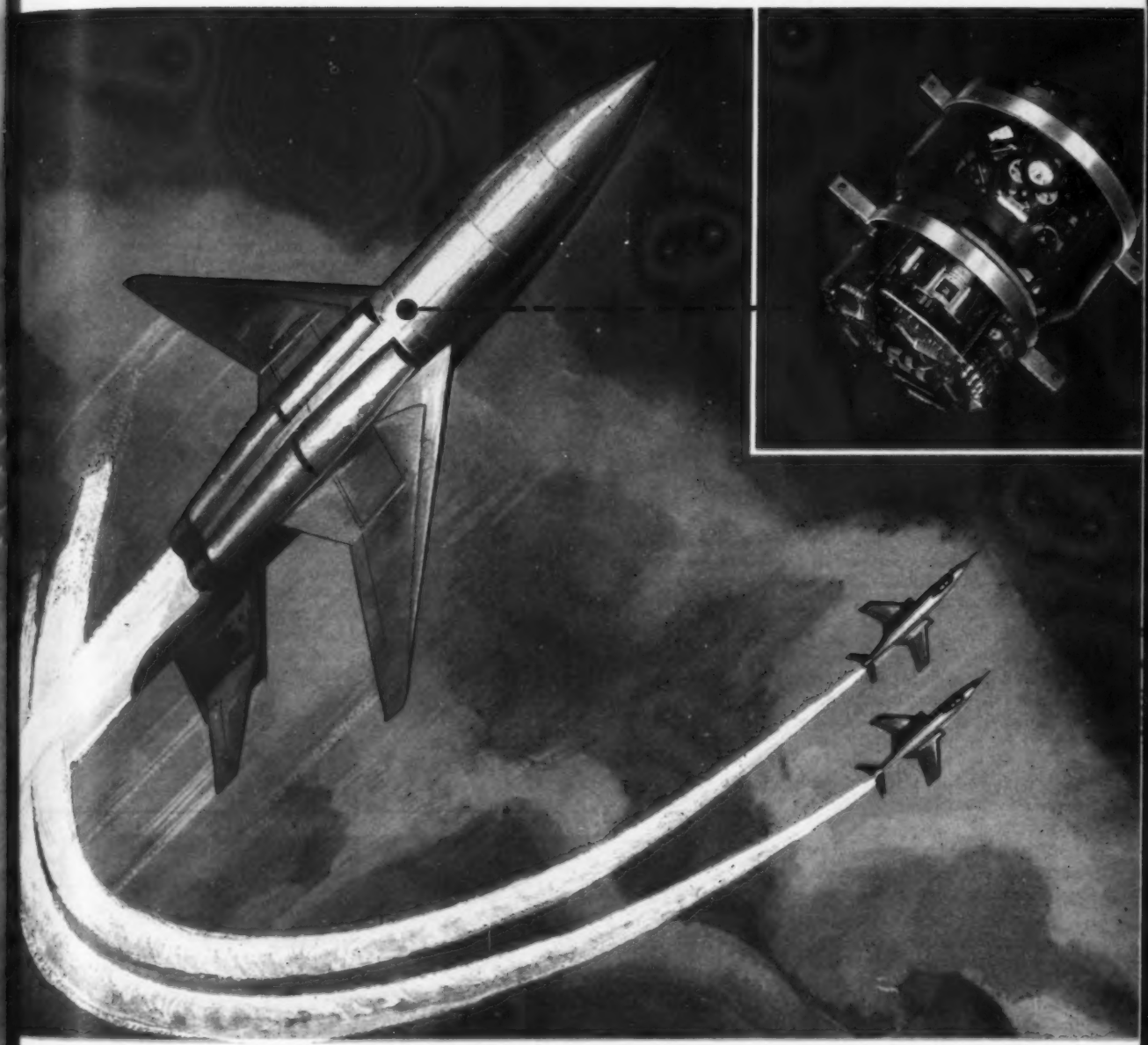
Capital AIRLINES

ROTOL LIMITED · GLOUCESTER · ENGLAND

Room 1501 · 630 Fifth Avenue · New York

Bendix 3-GYRO STABLE PLATFORM*

*Developed in conjunction with Flight Control Laboratory, Wright Air Development Center



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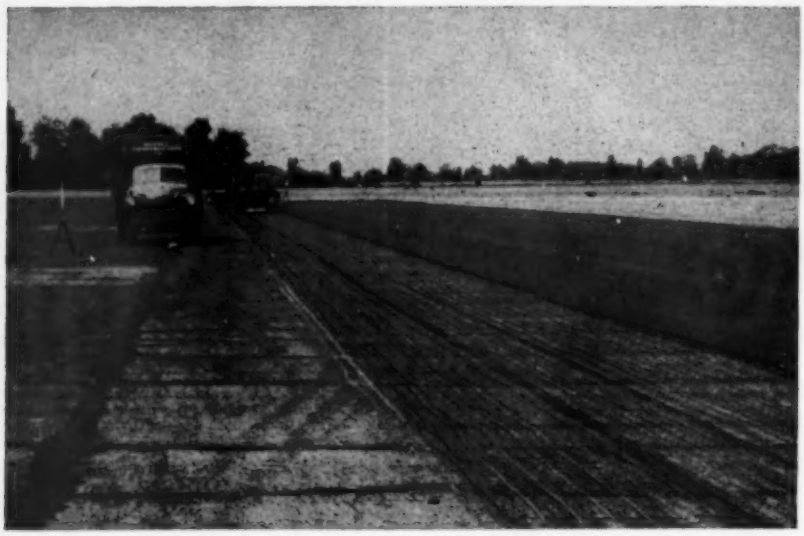
Bendix AVIATION CORPORATION

Circle No. 27 on Reader Service Card.

Maintenance Bulletin Board

Wire Fabric Resurfacing Used at Willow Run



WELDED WIRE FABRIC (right) was used to minimize formation of cracks in new surfaces laid over old concrete pavement at Detroit's Willow Run Airport. Resurfacing consisted of three inches of asphaltic concrete reinforced by wire fabric. Placed directly on old pavement, fabric was sprayed with tack coat and covered with bituminous concrete base.

A new type of asphalt resurfacing, reinforced by welded wire "fabric," is expected to reduce maintenance costs of runways at Detroit's Willow Run Airport by as much as 70%, according to the Wire Reinforcement Institute, Inc. Willow Run was said to be the first airport anywhere to use this type of resurfacing.

The original airport pavement was not reinforced because of the steel shortage prevailing when it was laid.

Cracks in asphalt resurfacing frequently reflect cracks developing in the concrete underneath. To minimize the amount of cracking in the new surface and thereby extend the life of the original pavement, the Wire Reinforcement Institute says, there was only one answer: welded wire fabric reinforcement, used with three-inch-thick bituminous concrete.

The project involved the half-mile-long center taxi-way and the 3,500-foot long west ramp. Approximate cost of the improvement was $160,000.

The resurfacing job was done by the Howell Construction Co. of Howell, Mich., which found itself obliged to use new techniques when laying the hot asphaltic concrete mix over the welded wire fabric.

Specifications for the mix called for a two-inch binder course weighing 224 pounds a square yard and a one-inch surface course at 122 pounds a square yard. The binder mix consisted of 69.1% stone with a maximum aggregate of 1¼ inches, 26% sand and 4.9% asphalt content.

The project covered approximately 70,000 square yards of pavement. It required nearly 90 tons of welded wire fabric and about 14,000 tons of bituminous concrete and was completed in 21 working days.

SAC J33 Overhaul Marks More 'Firsts'

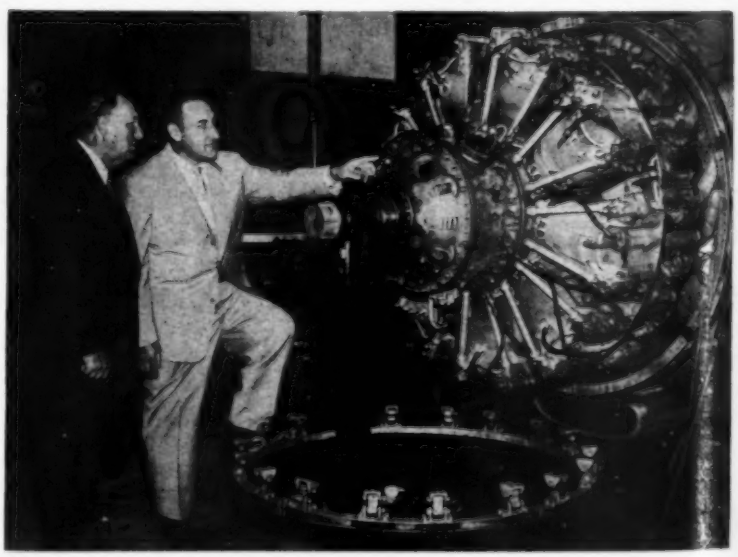
Air Force contract to Southwest Airmotive Co. for overhaul of Allison J33 jet engines is not only the first instance of jet overhaul by a non-manufacturing, non-military agency. The Dallas firm claims two other firsts for the J33 venture:

- First civilian operation of any kind to overhaul both the engine and its accessories.
- First U.S. non-manufacturing company to overhaul jet engine starting controls and main fuel controls.

Too Little Saving

American Airlines has removed the Goodyear-developed skid indicator system from its Convair 240 test airplane, completing a two-year-long service evaluation. Conclusion was that the tire-wear saving afforded by the system would not be great enough to warrant installation and maintenance of skid indicators.

Principal feature of the Goodyear system is that it provides the pilot with a skid indication only and does not automatically release and apply brakes during a landing roll.



CAB CHAIRMAN Ross Rizley (left) looks over Pratt & Whitney R2800-CB16 engine for Douglas DC-6B in Western Air Lines' overhaul shop during recent west coast tour. With Rizley is Anton Favero, WAL overhaul shop superintendent.

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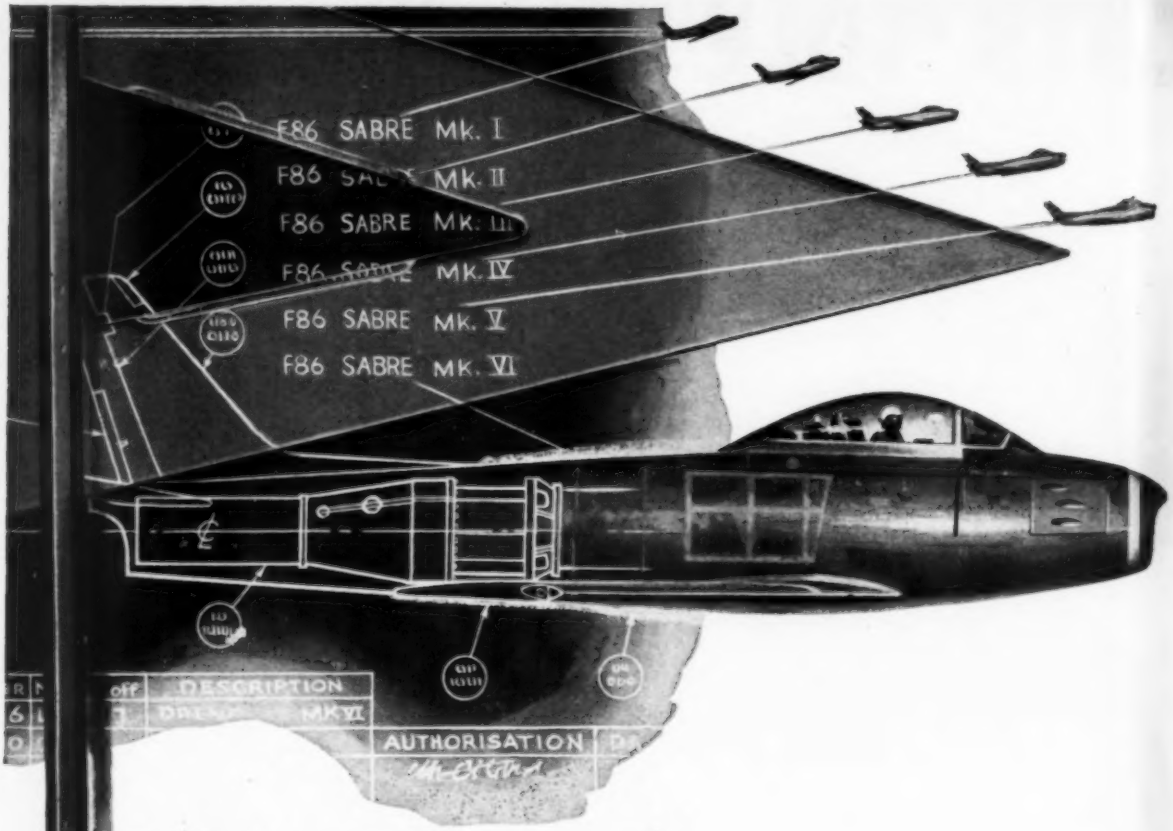

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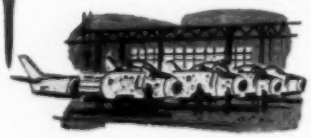

It was recently announced that the latest Canadian-built F86 Sabre jet fighter can fly faster and climb higher than any other aircraft in European squadron service . . . practical evidence of Canadair's superior development and production facilities.

This is the sixth version of this famous fighter which has been produced continuously at Canadair without interruption of scheduled delivery dates. The outstanding record of the Orenda-powered Sabre VI can be credited to the intricate re-engineering of the airframe to take full advantage of the aircraft's new power plant — the Canadian Orenda 14.

In this job, as in the work now going on at Canadair to design and produce the CL.28, a maritime reconnaissance version of the Bristol Britannia, the RCAF depends on the imagination and "know-how" of Canadair's engineers. Like so many aviation experts around the world, they know that in every aspect of production, "You can count on Canadair".

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People

Perry

Dudley

MANUFACTURING

Sam O. Perry promoted to asst. chief engineer—missile projects, Chance Vought Aircraft; **Harry C. Nissen** succeeds Perry as chief project engineer, Regulus;—**John H. Drew** named chief of systems analysis.

B. W. Dudley appointed gen. mgr. of the Propeller division of Curtiss-Wright Corp.

J. C. Franklin made asst. group executive on admin. staff of the eastern divisions, Bendix Aviation Corp.; Dr. Russell D. O'Neal named director of weapons systems planning; L. L. Jones named asst. to the gen. mgr. of the aircraft products division.

Warren C. Wilson appointed advertising and public relations mgr. for Servomechanisms, Inc.

John P. Fitzsimmons made facilities administrator of Eaton Mfg. Co.'s aircraft division.

Rear Adm. Arthur S. Born (USN ret.) elected asst. to the vp-research and development, Collins Radio Co.

W. V. Neisius appointed vp- applications and sales, Logistics Research Inc.; A. Y. Baker made vp-development and production.

William Patterson, Jr., named jet engine specialist for engine-mounted oil-hydraulic controls and equipment, Vickers Incorporated.

L. F. Jeffers elected president of Hayes Aircraft Corp.; N. F. Vanderlip and William B. O'Neal elected vice presidents.

Benecchi

Roy J. Benecchi elected vice president of Lear, also appointed division gen. mgr. of Grand Rapids division.

John J. O'Neil reassigned as executive asst. to the director, Cornell Aeronautical Laboratory; John C. Kane made personnel mgr.; Alvin E. Green replaces O'Neil as contract mgr.

Arthur F. Naylor resigned from Lear, Inc., to form Naylor Engineering Co., Grand Rapids, Mich.

C. Allan Fee elected vice president and secretary of ACF Industries.

C. W. (Chris) Hesse made mgr. of Cessna Aircraft Co.'s Pawnee Road plant.

Ralph Bonafede named production mgr. for Republic Aviation Corp.

Walter J. Hatcher appointed director of personnel admin. and public relations for Doman Helicopters, Inc.

William R. Alexander appointed director of engineering of The Steel Products Engin. Co.

John T. Hickey named gen. mgr., **Dr. Virgil E. Bottom,** director of research and development, and **Edmund G. Shower,** product production mgr., for Motorola, Inc.

English Electric Co., Ltd. has made the following appointments: **F. D. Crowe,** Canberra chief designer; **A. R. Ellison,** P-1 chief designer; **R. F. Creasy,** ass't chief, engineer projects; and **J. C. King,** ass't chief engineer, special development.

Hugh P. Moore elected vice president of Lynn-Deatrick, Inc.

HONORED

Maj. Gen. Lucas V. Beau, national commander of the Civil Air Patrol, awarded the 1955 Hoyt S. Vandenberg Memorial Trophy "For distinguished service to airpower in the field of air age education."

Lt. Col. John P. Stapp, USAF medical officer, received the Air Force's Cheney Award for 1954. Col. Stapp's experiments on a rocket-propelled sled have contributed data for bail-out procedure from high-altitude supersonic aircraft.

Beau

Stapp

AIRLINE

William J. Mitchell appointed vp-traffic and sales for Bonanza Airlines; R. H. Herrnstein named vp-finance.

Capt. John H. Ganley appointed divisional chief pilot, Mohawk Airlines, with offices at Newark Airport.

Mel Brenner joins American Airlines; **Lucius W. Burton, Jr.,** succeeds Brenner as aviation advisor to Under Secretary of Commerce Louis S. Rothschild.

Elbert Cheyno resigns as asst. to the president of Allegheny Airlines to accept a position with Kindred Aviation of Burbank, Calif.

Dale A. Danielsen made superintendent of new communications department of Riddle Airlines.

B. Paul Blaine named asst. director of route development in Trans World Airlines' Washington office.

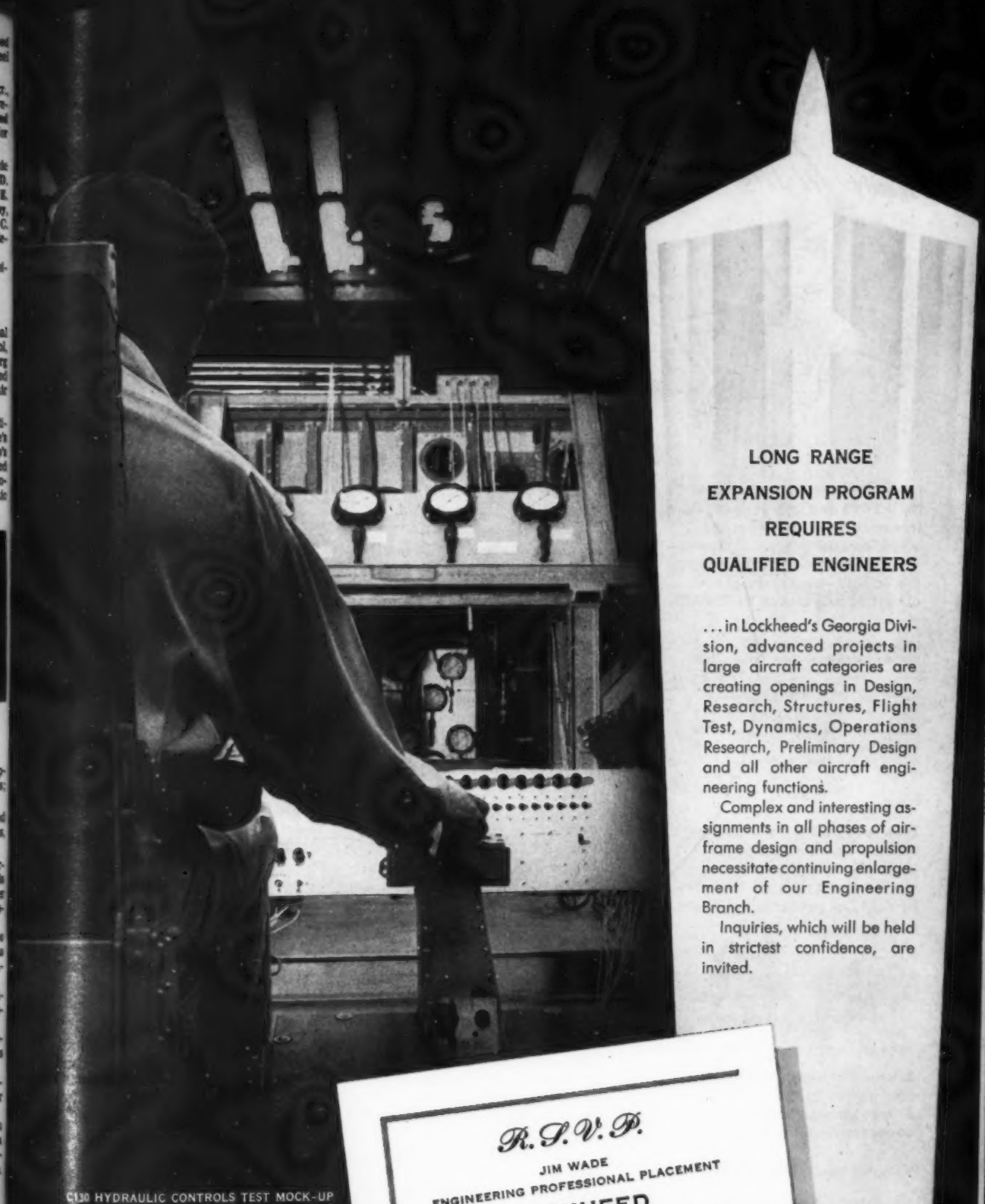
Charles Hagedorn becomes Washington district manager for Japan Air Lines.

William H. Hall, director of design engineering at American Airlines' Tulsa overhaul base, appointed resident representative at Lockheed Aircraft Corp. on the turboprop Electra program.

GOVERNMENT

Col. William L. McCulla made vice commander of the Arnold Engineering Development Center, Tullahoma, Tenn.

Anthony T. Callanan appointed executive controls officer of the Civil Aeronautics Administration.



C130 HYDRAULIC CONTROLS TEST MOCK-UP

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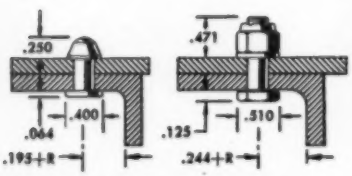
In weight comparison between HI-SHEARS and high strength close tolerance bolts, per thousand pieces and using a ¼" diameter—⅜ grip length—4650 lbs. shear, the bolt-nut-washer weight is almost double that of HI-SHEARS.

HS52P-8-6	Steel Hi-Shear Pin	9.25
HS15-8	Alum. Hi-Shear Collar	1.32
		10.57 lbs.

NAS464P4A7	Steel Bolt	17.35
AN365D428	Alum. Nut	3.40
AN960PD416L	Alum. Washer	.90
		21.65 lbs.

Even substituting a 40% lighter titanium bolt for the steel bolt, the bolt-nut-washer combination is still heavier than the HI-SHEAR by 4.14 lbs. per thousand pieces.



Substantial weight savings are also gained by the use of smaller fittings through reduced clearances required by HI-SHEARS.

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Circle No. 31 on Reader Service Card.

West Coast Talk . . . By Fred S. Hunter

- **Suggestion: Try out Nike on a B-47.**
- **VTO is tricky business for pilots.**

WONDER if the Department of Defense has given any thought to demonstrating the effectiveness of the Nike by sending the Western Electric-Douglas developed ground-to-air missile out after a B-47 converted to a drone? Seems like a real cool idea to us.

A B-47 would be an expensive target. B-47s don't come cheap. But the cost would be in the peanut category compared to the billion dollars or thereabouts going into the overall Nike program.

Hunter

What's more the Strategic Air Command now has a good-sized B-47 fleet and should suffer no pain or strain in releasing one, reluctant as it might be, for destructive purposes. Sometime back, Boeing-Wichita disclosed it had completed 1,000 B-47s and Douglas at Tulsa and Lockheed at Marietta are still grinding 'em out.

It would be much more comforting to the populace to see pictures in the papers and on television showing a Nike clobbering a fast, modern jet bomber, like the B-47, instead of a worn-out World War II B-17.

Such a demonstration also would quiet any belittlers who still think the Nike isn't as good as it's cracked up to be. It might even have a salutary effect on the Russians.

So why not? Needless to say, this suggestion is based on the assumption that the Nike can do the job. If it can't, let's find out and start all over again.

* * *

Having been unable to sell the Navy on a trainer version of the XFY-1, Convair may decide to build a tethering rig of its own at San Diego to solve the pilot check-out program.

Convair discovered how really tricky this VTO business is for pilots by comparing notes on the way a new pilot, J. W. Knedel, was able to handle the aircraft in checking out on it, as contrasted with the experienced "Skeets" Coleman. Coleman's smooth piloting reflected his background of experience in the tethering rig at Moffett Field. Coming in later, Knedel had no tethering rig time, and it showed in the pictures.

Of course, there is the possibility the Navy won't require Convair to check out any more VTO pilots. Loockheed has definitely shelved its XFV-1, obviously with Navy consent, and this may be a hint of Navy feelings regarding the entire VTO venture. After all, the Navy and Convair have given the VTO show a good start by pioneering the turboprop configuration, and it would be logical enough to decide to let the jets, like Ryan's XF-109, have a whirl at it for a while. Right now, the XFY-1 is in the shop for a few weeks for rework of a rate of descent indicator and various other items to enable Coleman to resume the company test program.

* * *

Reagan Stunkel expects to have his new Mar Vista Electronics Co. in position to move into a new home within 60 days. Meanwhile, he is continuing transistor production at Hydro-Aire's Burbank plant. Mar Vista now becomes the only transistor manufacturer on the west coast. Hughes Aircraft makes them, but only for its own products. Hughes does, however, have a germanium diode it distributes commercially.

* * *

Northwest Airlines has become the first airline to purchase a GCA set, having bought a 4-in-1 Quadradar from Gilfillan Bros. for installation at Shemya in the Aleutians. Pan American once operated a GCA unit at Gandar, but this equipment was borrowed from the military and was not PAA's property.

* * *

Lear, Inc. figures selection of its L-10 autopilot for the Boeing KC-135 jet tanker gives it a foot in the door for the coming jet transport autopilot market . . . Lockheed is scheduled to start submitting technical data on the turboprop Electra to the CAA next month . . . Northrop Aircraft recently established a new manufacturing-material reference library at its Plant 1.

coming
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AMERICAN AVIATION ADVERTISING OFFICES, LA GUARDIA AIRPORT, NEW YORK CITY

International Aviation

By Anthony Vandyk

The intense battle for the Latin American military aircraft market entered a new phase this month with the placing of an order by Peru for 16 Hawker Hunters. This is the first sale of a British swept-wing fighter to Latin America and, strangely enough, it materialized just a few weeks after Peru had become the first Latin American nation to receive an American swept-wing fighter.

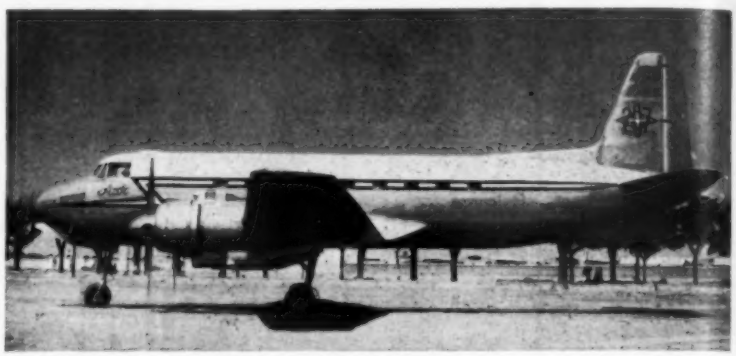
The Peruvian Air Force has taken delivery of six North American F-86Fs out of a total of twelve being supplied under Mutual Defense Assistance Program.

This is a credit plan under which one-sixth of the total payment must be made at the time of delivery and the remaining five-sixths at half-yearly intervals; thus the recipient nation has three years to pay for the planes it receives from the U. S.

• **Good though these terms** may be in comparison with what a U. S. manufacturer might care to offer, they do not compare with the type of deal that results from cooperation between British industry and government. The classic example of this was consummated about three years ago when Britain accepted 15,000 tons of Brazilian cotton in exchange for 70 Gloster Meteors. When this deal was announced, Sir Frank Spriggs, chairman of the Hawker-Siddeley Group (which owns Hawker, manufacturer of the Hunter, as well as Gloster), said that the negotiations with Brazil initially involved timber and iron being supplied to Britain and that "even dustbins or nuts" would have been accepted.

• **The Brazilian** "cotton for Meteors" deal undoubtedly was an extreme case but it is probable that financing arrangements of a type unobtainable in the U. S. have led to Britain supplying jet aircraft to several of the key Latin American nations. Apart from the Meteors for Brazil and the Hunters for Peru, Britain has supplied (or is supplying) English Electric Canberra bombers and Meteors to Ecuador; Canberras and Vampires to Venezuela, Meteors to Argentina and Vampires and Venoms to Chile. As far as is known Peru is the only Latin American nation to have received a U. S. combat-type jet aircraft and the only other country definitely slated to do so is Venezuela (F-86Fs).

The U. S. has of course been the major supplier of piston-engine military aircraft to countries south of the border; only Argentina has a substantial number of British planes in this category.



SPAIN'S CASA 207 AZOR transport should be flying this month. Powered by two 200-hp Bristol Hercules engines, the aircraft grosses 33,000 lbs. and will cruise at 215 mph. Manufacturer is Construcciones Aeronauticas, Getafe airport, Madrid.

Four Nations Interested in CF-100

Three European nations and South Africa are showing great interest in the Avro CF-100 Mark IV all-weather fighter following extensive European demonstrations of the Canadian aircraft. The Royal Air Force is actively planning to buy 50 as a result of four months' evaluation of three CF-100s at the RAF's Central Fighter Establishment.

The CF-100 would be used as a stopgap measure in the British air defense program, which is in bad shape because of the inadequacy of the Meteor NF 14, the RAF's standard night fighter, and the fact that the Gloster Javelin is still far from operational service. It is reported that the RAF is particularly interested in the CF-100 because of its Hughes radar lock-on fire control system. No British aircraft has yet been equipped with such a system and there is no similar British system available.

The second European nation reportedly negotiating for the CF-100 is Western Germany, which has already indicated that it wishes to acquire Canadair Sabre VIs for day fighter use. The deal under discussion would enable the Germans to get Sabre VIs free under the U. S.'s Mutual Defense Assistance Program if they buy the CF-100.

The key to this transaction is the Orenda engine which powers both aircraft and which, used in both day and night fighters, would be a major efficiency factor reducing maintenance costs and need for a multiplicity of engine crews and spares.

The Orenda is also understood to be the main factor in the consideration of the CF-100 by the South African government, which recently purchased $10 million worth of Sabre VIs and spares. The fourth nation reportedly dickering for CF-100s is Belgium, which has a requirement for an all-weather fighter with a higher performance than that of the F-86K.

Transport Briefs

Philippine Air Lines has been requested by President Ramon Magsaysay to submit a plan whereby the carrier could resume its transpacific services, suspended along with other PAL long-haul services since March 30, 1954. PAL has sold all its long-haul aircraft and reportedly is interested in leasing equipment to resume operations to the U. S. . . . **Scandinavian Airlines System** will introduce tourist-class on two of its three weekly "polar" flights to the West Coast October 5. These flights will also provide first-class accommodations while the third schedule will continue to be first-class only . . . **BOAC** is planning to extend its London-New York service to San Francisco before the end of the year; there would be a weekly Stratocruiser schedule; carrier is also planning a route from London to Tokyo across Russia and China which would be 3,650 miles shorter than the present route and 1,250 miles shorter than a "polar" route via Greenland.

SABENA Belgian World Airlines is to test in the Congo a DC-3 it has experimentally fitted with P&W R-2000 engines. Initial trials in Europe have proved highly satisfactory. Deceleration performance is to be improved by the fitting of Goodyear disc brakes.

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NORTHWEST *Orient* AIRLINES

Aero Design & Engineering Comes Up Fast With 1955 its Biggest Year

By LOIS C. PHILMUS

Announcement of early 1956 deliveries on what now appears to be the fastest conventional aircraft contender in the executive aircraft market climaxed the most eventful few months in the history of the four-year old Aero Design & Engineering Co. Unique from its conception, the company can well chalk

PEW

AMIS

up 1955 as its "come-of-age" year. In a four-month period, the twin-engine Aero Commander stole the limelight when:

• **It was chosen** as President Eisenhower's personal short-haul aircraft, marking a new aviation milestone, since it was the first time a President has ever flown in anything smaller than a four-engine transport.

• **It was chosen** by the Air Force, following evaluation of all production aircraft in its class, for an initial off-the -shelf order of 15 for "V.I.P." transportation.

• **Two new models** of the basic design were announced within two months of each other, to be produced simultaneously. The first was the Model 560A, which provides refinements over previous models, including a roomier cabin and cleaner nacelle lines, and is priced at $74,500.

The second—the Model 680 Super Aero Commander—has two supercharged Lycoming 340 hp engines, which create a top speed of 260 mph and a cruise speed of 230 mph at 10,000 feet with 70% power. Normal range is boosted to 1,400 miles with a maximum range of 1,600 miles. Gross weight is 7,000 pounds, with a disposable load of 2,750 pounds. Fuel capacity is 230 gallons.

Both models have optional seating arrangements for six or seven or a five-place arrangement with provisions for two full-length lounges, an ice-box, a toilet and a tuckaway table. Seats are easily removed to convert the planes for cargo use. The Model 680 Super, which will be priced at $84,500, has been equipped with a special console oxygen system as standard accessory for flying at altitudes above 12,000 feet.

The possibility that the new model will be pressurized eventually cannot be ruled out. Although expensive, such equipment can be installed, it has been indicated, "if the customers want it."

Production of the Model 560A (the model ordered by the Air Force) will continue, Rufus T. Amis, company president, said, "since both it and the Model 680 Super fill a definite need in the business airplane field." Philosophy of the company, which pioneered the small twin engine aircraft field, has been to cater primarily to the executive aircraft market. It is the first company to establish production exclusively for the group.

• **The 1955 schedule** has been averaging from seven to eight planes a month and this is being stepped up shortly to from 10 to 11 a month. Since its first production Model 520 rolled off the line for delivery to the *Chicago Tribune* in February 1952, the company has delivered about 245 Aero Commanders. During the first seven months of 1955, 35 Model 560's were delivered at an approximate dollar value of $2,391,000, with 12-month total estimated at about 80 to 85 planes for sales possibly hitting the $6 million figure. Orders for future deliveries, it has been said, extend well into 1956. The company ended 1954 with sales totaling $3,900,000 and entered 1955 with a $1,200,000 backlog of orders.

All these events have caused company officials to think of plant expansion at Tulakes Airport in Oklahoma City, where production facilities are being fast outgrown. Land has been purchased south of the present site and plans probably will be drawn shortly.

About 480 people are currently employed, compared to the relative handfull of employes that were gathered in October, 1950, when the company was organized to put the designs of the Aero Commander into business. Work on the prototype was done in a garage.

The rights to the Aero Commander were purchased from the group which designed the aircraft in California. The design team, headed by T. R. Smith, who now serves as vice president of research and development, was composed mainly of a group of Douglas Aircraft Company engineers who had been associated with the A-26 project. This accounts for the Aero Commander's reputation for being "a small airplane with big plane characteristics."

• **Aero Design** is not a stock-holding set-up. Main financing has been provided by George T. Pew, chairman of the board, who now devotes his full time to the project. A pilot since 1935, Pew is a graduate of the Massachusetts Institute of Technology. Prior to acquiring his interest in the aircraft company, he served as assistant to the president of Sun Oil Company in Philadelphia, with which he had been associated since his graduation.

A lesser financial interest is maintained by Amis, company president, who left his family's Amis Construction Company in Oklahoma City to organize Aero Design. He began flying in the early 1940's and earned his multi-engine rating in 1944. This led to the use of executive aircraft by the Amis company. He assisted in organizing the downtown airpark in Oklahoma City in 1946 and now serves as its president.

With Pew and Amis guiding the destiny of the company, Smith devotes his time to research and development. A special division was established in August 1954 at Max Westheimer Field, near the University of Oklahoma School of Aeronautical Engineering.

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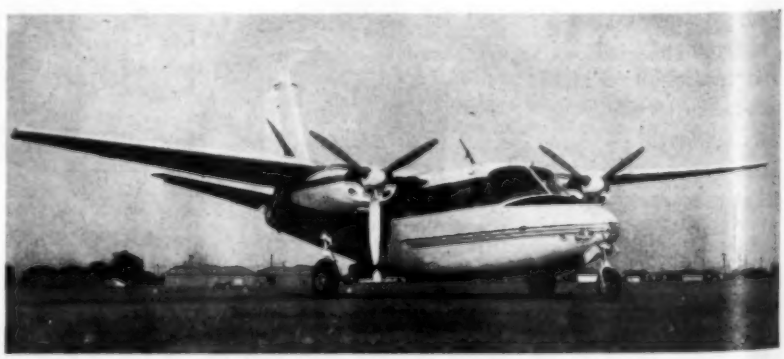


FASTEST in its class, the Model 680 Super Aero Commander has two supercharged Lycoming 340 hp engines that create a top speed of 260 mph. Deliveries are expected early in 1956.

Lee, Kettering to Address NBAA

Program for the annual meeting and forum of the National Business Aircraft Association in Detroit October 5-7 will feature as its principal speakers CAA Administrator Fred B. Lee, Charles F. Kettering, former vice-president of General Motors, and Dr. John Furbay, education director of Trans World Airlines.

Gill Robb Wilson, president of the Air Force Association, will address the Honors Night banquet with Jennings Randolph, assistant to the president of Capital Airlines, acting as toastmaster.

The current status of TACAN is scheduled to be summed up by Col. Jack Taylor, director of the Air Navigation Development Board.

New emphasis on the NBAA meeting calls for increased use of panel discussions on various aspects of business flying.

"Business Aircraft Operators Need Improved Airports" is the topic for Thursday's opening session, with Carl W. Clifford of CAA moderating. Panel members include Robert Aldrich, president of Airport Operators Council; Oscar Hostetter, president of the National Aviation Trades Association; and Leigh Fisher, airport consultant.

• **Pilot proficiency** will be discussed by Michael Murphy of the Ohio Oil Co.; Baker Bradenbaugh of U.S. Aviation Underwriters and James Magnus, Minneapolis-Honeywell, with Buril Barclay of CAA as moderator.

• An **Exchange** of "useful information" will be conducted by Jerome Lederer of the Flight Safety Foundation, heading six-man group.

• **Series of maintenance panels** will get under way Thursday afternoon, including discussions on "Maintenance of Today's Aircraft," with J. R. Salzman of General Motors moderating, and "Keeping Business Aircraft Operations Up-to-Date," moderated by Donald Stuart, director of CAA's Technical Development and Evaluation Center.

• "Administration of Business Aircraft Operations" will be handled by Hal P. Henning, of General Motors, with a five-man group, at the opening session Friday, followed by a "crystal ball" panel on "Planning for Tomorrow's Business Flying."

James Riddle, president of National Aeronautical Radio Company, will moderate the planning panel, which includes R. James Pfeiffer, director of commercial sales, Fairchild Engine & Airplane Co.; Robert Northington, vice president, Piedmont Aviation; John Basanese, General Aircraft Supply Corp., and William Wiseman, Continental Motors Corp. • • •

CAA Official Invents Landing Safety Device

A safety device to warn pilots against inadvertent retraction of Beechcraft C18S landing gear has been invented by Frank P. Davis, CAA deputy chief of the aircraft control device division. The warning system works from a switch, the cover of which is marked

"Landing Gear Position." The cover must be raised by hand and held up while the toggle switch (just below finger end) is tilted upward to raise landing gear.

If the procedure is used at any time that the plane does not have flying speed, a horn blows in the cockpit when the cover is lifted. The switch operating the warning signal is mounted to the right of the word "Up." Using the standard warning signal on the Beech, the new device warns against retracting the gear immediately after touchdown, while maneuvering on the ground, or during takeoff.

354 Civilian Planes Shipped During July

Civilian aircraft shipments during July numbered 354 units valued at $28,804,000, according to a joint CAA-Census Bureau report. Corresponding 1954 totals were 293 planes valued at $23,895,000, reflecting a 20.5% increase.

Engine shipments for civilian aircraft during the month numbered 522, worth $4,100,000 and aggregating 235,400 hp.

July shipments of 327 utility and executive aircraft in the one-to-ten-place category are reported by Aircraft Industries Association Utility Airplane Council. Total includes 294 planes of four places or more and 33 one- and two-place aircraft with a total value of $4,942,000.

Ford to Install Airborne Radar

Ford Motor Co. is planning early installation of airborne weather radar in its six-plane executive fleet. Equipment now contemplated for the program is C-band radar built by Radio Corporation of America.

CAA Licenses Royal Gull

First award by CAA of a type certificate for a foreign aircraft built to U.S. standards took place in Italy on September 13. CAA engineering director Henry Weeks presented Piaggio officials with certificate No. 183 for the P136L amphibian.

The Italian-designed twin-engined plane is now approved for sale and operation in the U.S. by Royal Aircraft Corporation of Milwaukee. It is more familiarly known as the Royal Gull amphibian.

Bensen Gyro Gliders Approved by CAA

CAA recently issued Aviation Safety Release No. 396 for operation and certification of the gyro gliders sold in kit form by Bensen Aircraft Corporation. The glider may be flown under the Civil Air Regulations if it is operated only as (1) a large kite under Part 48 provided no free flight is attempted and operation is confined to flights at the end of a towline from the surface; and (2) as an experimental aircraft if certificated as an amateur-built rotorcraft under Part 1.

Safe Flight System For Aero Commander

Aero Design & Engineering Company has approved the Safe Flight Speed Control System as optional factory-installed equipment on the Aero Commander. The computing system provides data for take-off, landing and low speed operations, and also gives the pilot information for making adjustment for asymmetrical power conditions.

Wing measurement is the basic principle involved in the system, which compensates for flight variables of power, gross weight, flap and gear position, turning and longitudinal accelerations, ground effect and density altitude.

AMERICAN EXTENDS FAMILY ½ FARE PLAN TO THURSDAYS!

Beginning October 10th,* you can save from 12:01 Monday noon to 12:01 Thursday noon

American is extending its famous Family ½ Fare Plan to Thursday mornings to give families a wider choice of fare-saving days.

Up to now it was only on Mondays, Tuesdays and Wednesdays that any person who purchased a full fare ticket could take along his or her spouse and their children for half fare. But beginning October 10th,* American's Family ½ Fares will be in effect from 12:01 Monday noon to 12:01 Thursday noon.

In 1948 American Airlines first introduced the Family ½ Fare Plan. Since then thousands of families have saved hundreds of dollars by using it. Next time you plan a family trip, remember that American offers the widest choice of days on which you can enjoy Family ½ Fare savings.

**subject to CAB approval*

AMERICAN AIRLINES

America's Leading Airline

TRANSPORT TRENDS Washington, D. C., Sept. 26, 1955

THE FIGHT FOR NEW ROUTES among U.S. domestic airlines is growing in intensity as the apparent route shake-up may be the greatest in the Civil Aeronautics Board's 17-year history. Next decision will be in the Denver Service Case which is now being weighed by the Board and which has major transcontinental lines battling among themselves and, jointly, against almost certain inroads to be made by regional carriers.

Key CAB figure at this time is Member Josh Lee whose pro-competition philosophies prevailed in the New York-Chicago Case and may be a deciding factor in the Denver and Southwest-Northeast Cases.

Lee is virtually running the route show while, at the same time, waging a strong bid for reappointment to a new six-year term. A Democrat, he is bucking an Administration policy of replacing holdovers with Eisenhower Democrats. But he has strong support among small carriers and might end up with CAB Chairman Rizley's backing.

STEP-UP IN AIRLINE ACTIVITY in flight evaluation of Boeing's 707 prototype jet transport points to a possible early break in the Douglas-Boeing battle to land the first big jet order. During a single five-day period recently, pilot-engineer groups of three major carriers, Pan American, American and United, flew in the 707 for extended demonstration flights.

First airline pilot to fly the jet from the left-hand side on take-off was PAA's Scott Flower, Atlantic division asst. chief pilot. Flower flew as "captain" at the outset of a three-hour PAA evaluation flight. W. W. Littlewood, American v. p.-equipment development, and D. R. Petty, United v. p.-flight operations, headed their respective airline engineering teams.

NATIONAL AIRLINES' FIGHT for a stay of procedural steps in the Eastern-Colonial Merger Case is headed for the Supreme Court. National indicated it contemplated such action following recent denial by U.S. Court of Appeals, District of Columbia, for a stay petition. Appeals court also dismissed NAL's petition for review of CAB orders limiting issues in the merger case.

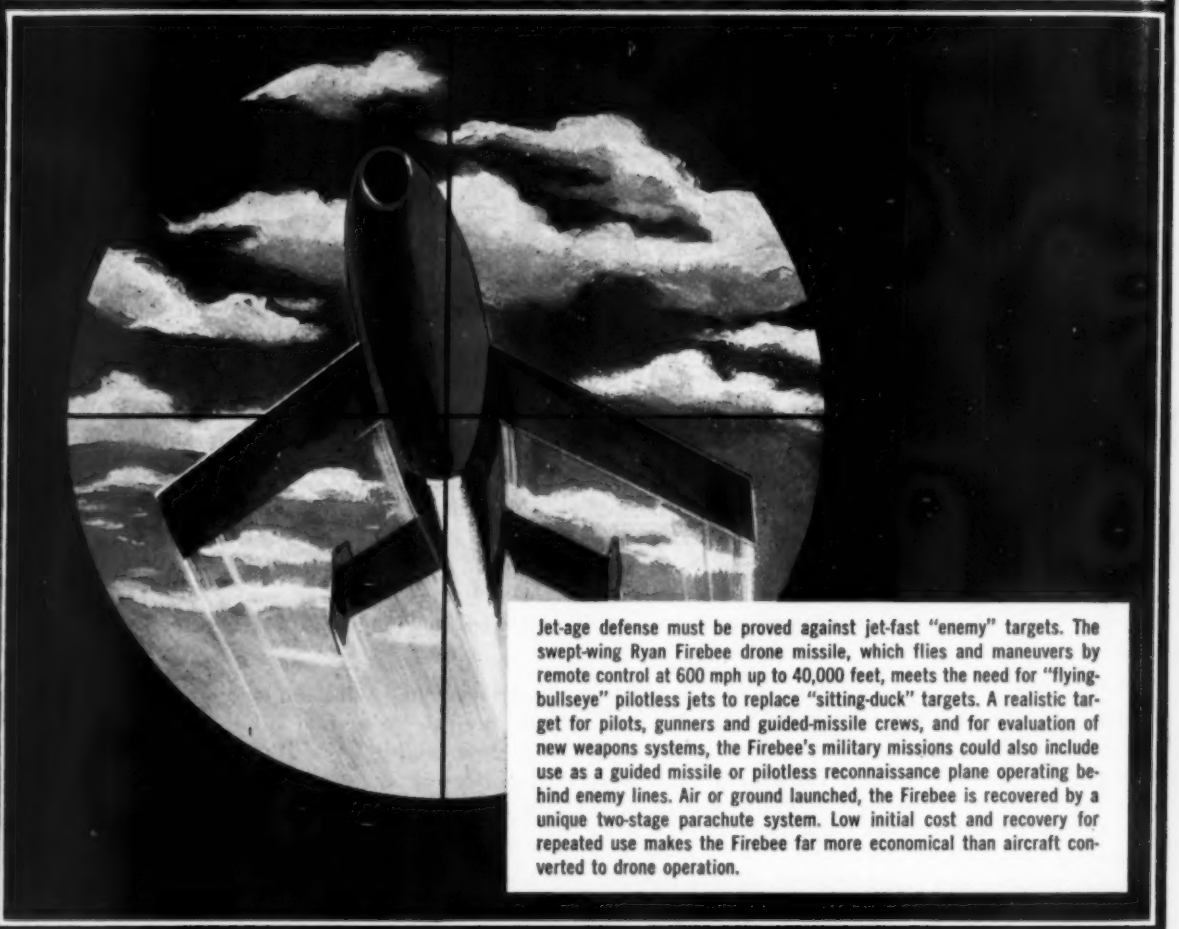
AERO DESIGN & ENGINEERING CO. which got a big sales boost from Presidential choice of its Aero Commander for short-haul flying, may land additional business with this model from a new source. One local service airline is seriously considering its purchase for use on low-traffic routes where only five or six passengers are carried on the average flight.

A SHARP RISE IN AIR TRANSPORT'S SHARE of the common carrier market, ranging from its present level of 29% to more than 50% by 1965, is predicted by CAA in a recently completed traffic forecast. A large part of the increase is anticipated from coach service expansion and inauguration of intercity helicopter operations.

Although air cargo traffic has fallen short of expectations during the last two years, CAA sees a more promising outlook by 1965, predicting an annual increase in volume slightly over 10% to 800 million ton miles by that year.

International and overseas passengers for U.S. airlines are expected to rise to six million from the 2.8 million carried in 1954. In specific route operations, traffic over the North Atlantic, Pacific and Alaskan routes will increase at a greater rate than South American business, CAA feels.

FIREBEE–600 MPH "BULLSEYE"



Jet-age defense must be proved against jet-fast "enemy" targets. The swept-wing Ryan Firebee drone missile, which flies and maneuvers by remote control at 600 mph up to 40,000 feet, meets the need for "flying-bullseye" pilotless jets to replace "sitting-duck" targets. A realistic target for pilots, gunners and guided-missile crews, and for evaluation of new weapons systems, the Firebee's military missions could also include use as a guided missile or pilotless reconnaissance plane operating behind enemy lines. Air or ground launched, the Firebee is recovered by a unique two-stage parachute system. Low initial cost and recovery for repeated use makes the Firebee far more economical than aircraft converted to drone operation.

Another Example of How

RYAN BUILDS BETTER

America's fastest, most elusive target—the Firebee—is an outstanding achievement in advanced design. To meet the needs of America's air defense, Ryan engineers created this new pilotless aircraft by skillfully blending their knowledge of aerodynamics, jet propulsion and electronics. For more than 32 years, industrial and military leaders have called upon Ryan to solve the increasingly complex problems of aeronautical science. Striking examples are the Firebee, Ryan's new jet VTO airplane, precision built components for jet, rocket and piston engines, and electronic devices for guidance and navigation.

Engineers looking for a challenging future will find outstanding opportunities at Ryan.

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METALLURGICAL ENGINEERING	WEAPONS SYSTEMS		ROCKET MOTORS & RAM JETS	AIRCRAFT EXHAUST & DUCTING SYSTEMS

CAB Acts to 'Perfect' Nation's Air Network

- **Five airlines benefit by awards in New York-Chicago service case.**
- **New services likely to be authorized in Denver and Northeast-Southwest cases.**

By WILLIAM V. HENZEY

THE TREND within the Civil Aeronautics Board towards giving additional sources of strength to regional trunk airlines through new route grants (AMERICAN AVIATION, Aug. 15) was confirmed emphatically by the Board's decision in the New York-Chicago Service Case this month.

In addition, the agency made clear its desire for more coach services and further stated that, where practicable, it would eliminate route restrictions and deficiencies of the larger carriers.

Perhaps the key language in the decision was the Board's statement that its new route awards are and will be designed to "perfect the nation's route structure."

Under one or more of these policy objectives, Capital, Northwest, TWA, Eastern and United received new route authorizations as the current wave of major route proceedings—the first since 1951—moved into the area of reality.

• **Currently, the Board** has under consideration the Denver Service Case in which oral argument was held September 15. A decision in the near future is expected, with Continental, Western, TWA, American and United among aspirants for new route authorizations.

Next month, the sprowling Northeast-Southwest Service Case will be argued before the Board and a decision by November 1 is a distinct probability.

Because of the imminence of decisions in these latter two cases, the policy findings in the New York-Chicago Case are of extreme significance to the industry. Such findings perhaps will be tempered in future cases by the balancing necessary to assure that a maximum number of carriers benefit.

But here's what CAB did and why it did it in the New York-Chicago Case:

• **Capital** was authorized to operate unrestricted between New York, on the one hand, and Chicago, Detroit, Toledo or Pittsburgh, on the other. It was granted a new segment between Detroit and New York via Buffalo and Rochester. Philadelphia was added as a new intermeditae point.

Said CAB: "New services authorized for Capital are suitable for operation by a regional carrier, and capable of contributing substantially to the strengthening of Capital's system, an objective of great importance in the sound development of a national air transport system and in perfecting the nation's route structure.

"The need of a carrier for additional strength is a significant factor in selection of a carrier where the strengthening is not required for the advantage of the individual carrier as such but for the sound development of the national system of which it is a part.

"The further development of low fare air transportation is an objective required by the public interest and will be stimulated by the certification of Capital.

"Capital's proposed operation will not jeopardize the operations of existing operators who possess competitive advantages in the form of historical participation in markets and greater resources."

• **Northwest** was authorized for the first time to operate direct service between Chicago and New York, subject only to a long-haul restriction requiring such flights to originate or terminate at Twin Cities or west, and New York. Also, NWA was granted unrestricted rights to operate between New York and Detroit.

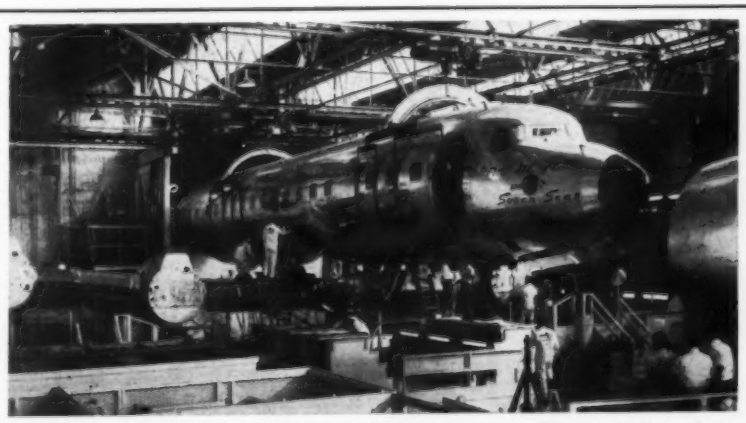
Commenting, CAB said: "The Chicago extension will remedy a major weakness in NWA's route structure and enable it to become a more effective competitor with United in transcontinental service."

With "strengthening" thus a major factor for both Capital and Northwest in these awards the Board framed its policy this way: "While other applicants for New York-Chicago service could provide such service in lieu of Capital and Northwest, their service would block needed improvements in the route patterns of Capital and Northwest which route adjustments are vitally necessary for a balanced and sound national route system."

• **TWA's** new awards authorizing service to Detroit on an east-west basis and to Cleveland on its New York route, were based on (1) the "route-improvement" argument and (2) its low-fare coach accomplishments.

"A proper coach service between New York and Detroit," CAB concluded, "would generate substantial additional traffic and TWA, as a vigorous coach operator, will give further assurances of such development in this market."

Of the Cleveland award, the Board



FUSELAGE AND WING of first Douglas DC-7C airliner are being mated in above photo. The 350 mph "Seven Seas" luxury transports will start rolling out of the Douglas-Santa Monica plant in November. First flight is scheduled for December. Ninety-nine of the big planes are on order.

said "TWA's proposed coach schedules would provide a substantial improvement in Cleveland's service to the West Coast, and also make a significant contribution to the Cleveland-New York market in the coach field."

• **United** and **Eastern,** meanwhile, qualified for their awards under the elimination - o f - antiquated - restrictions theory.

United, which has been required to make one stop at Denver or a point west on all flights between Seattle/Portland and Chicago, was freed of the restriction permitting it to operate a non-stop service in competition with Northwest.

Eastern has had a "closed-door" restriction prohibiting it from carrying local traffic between Pittsburgh, on the one hand, and Akron, Cleveland and Detroit, on the other. CAB removed the restriction, but will still require that flights serving those points originate or terminate at Roanoke, Va. or a point south.

With the exception of a concurring and dissenting opinion by Vice Chairman Joseph P. Adams, the Board voted unanimously for the new route findings.

• **Adams, expressing dissatisfaction** with coach progress in the New York-Chicago market, felt the record should be kept open for one year with respect to coach applications of National and North American. If newly-certificated lines did not show sufficient coach progress in that time, the two deferred applications would again have been considered under Adams' unsuccessful proposal.

In addition to the National and North American applications, others denied were those of Braniff (for a Chicago-Detroit extension) and Colonial for a New York-Chicago extension.

Meanwhile, the Board appeared to settle another argument which has been prominent in the development of the current list of route cases, namely, whether new competition means more traffic on a route or a division of existing traffic.

• **Commenting specifically** on American Airlines' estimates of heavy diversion which would result from the newly-certificated services, the Board said: ". . . we find that American's diversion estimates do not take adequate account of the growth in the markets involved and the stimulation of new traffic that will flow from the new competitive services.

"In our judgment, a substantial part of the revenues which the new services receive will flow from newly developed traffic rather than from traffic generated by American. This will be especially true with respect to coach services that will be offered."

It is also noteworthy that the new route cases now being decided mark the first time in the history of CAB that the subsidy question has not been a major influencing factor.

While it is true that the Board will attempt to free the remaining few subsidy lines from Government support by strengthening route awards, it is not now necessary for the Board to consider how much the subsidy bill will be increased by adding competitive services, since most of the industry is subsidy free.

• • •

'Panoramic' Windows to Feature Redesigned Hawaiian DC-3 Fleet

FOUR LARGE 'PANORAMIC' WINDOWS, with a total space of 6,000 square inches as compared with the customary 2,600, will help transform Hawaiian Airlines' fleet of DC-3s into "Viewmasters," comparable to luxurious transcontinental aircraft.

"Panoramic" windows, custom-made chairs and plush Saran rugs will be among the features of the Hawaiian Airlines' redesigned fleet of DC-3s in the near future.

The converted aircraft will have four 17 x 57-in. windows and eight measuring 17 inches square, compared with the usual quota of fourteen 12x16-in. windows in DC-3s. Extra-thick plexiglass will be used for all windows in the planes, which will be renamed "Viewmasters."

Plans for the unusual conversion were announced by the airline's president, Arthur D. Lewis, at the regional convention of the American Society of Travel Agents in Las Vegas, Nev. early this month. The Garrett Corporation's AiResearch Aviation Service Division, Los Angeles, has been appointed to handle the redesigning job.

ARTIST'S CONCEPTION of a passenger taking pictures from the 17-by-57-inch window of a Hawaiian Airlines' Viewmaster. HAL's DC-3s are being redesigned by the Garrett Corp.'s AiResearch Division.

• **The new panoramic windows** are believed to be an industry "first."

Original DC-3 furnishings and fittings will be completely removed from the HAL fleet and new lightweight, fireproof interiors will be installed. A contour-forming polyester material will be used in the seats instead of foam rubber. They will be covered by a rich "Hawaiian Princess" cloth developed for HAL by one of the largest U.S. weavers. The color scheme combines a "sea-foam blue" background with stripes of gold and silver thread and sienna brown.

• **Walnut paneling** on the forward bulkhead will be highlighted by gold trim, with brass insets of a map of the outline of the Hawaiian Islands. Cabin interior draperies will have an India print on a blue background. Plush brown Saran rugs in a tight twisted weave will be installed.

Safety factors in the Viewmasters will include a special one-piece "bird-resistant" windshield.

The new design has been approved by the CAA, Lewis said, and the first plane will be completed late in November. Each of the Viewmasters will be christened with the name of an Hawaiian princess, while each of HAL's Convairs will be named of an Hawaiian queen.

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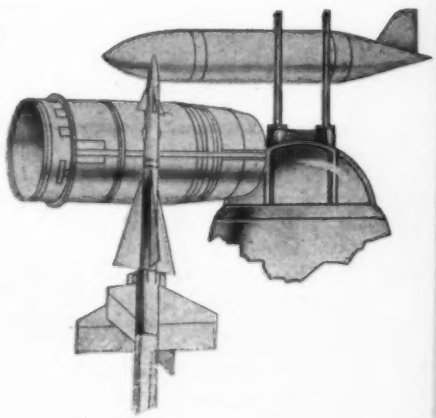

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Convair 440 Orders Dent Viscount Market

Orders from three European airlines give American plane new lift in sales battle with British.

By ANTHONY VANDYK

A new phase in the Convair versus Viscount sales battle has been reached with the purchase of the Convair 440 Metropolitan by two more of Europe's leading airlines—SABENA Belgian World Airlines and Swissair. These orders, involving 12 aircraft for SABENA and eight for Swissair, came less than a month after Scandinavian Airlines System bought 11 Metropolitans (AMERICAN AVIATION, September 12). Each of these airlines ordered the Metropolitan after careful evaluation of the Vickers Viscount.

With 46 Metropolitans in its order book, the Convair Division of General Dynamics Corporation has assured a new lease of life for the Convair-Liner. Time will tell whether the availability of this quieter and faster version of the 340 is having a braking effect on Viscount sales. Present indications are that this may be so.

The scoreboard at this writing is: Viscounts sold, 236; Convair-Liners sold (240s, 340s and 440s), 417. In the past few weeks Convair has announced new commercial orders for over 35 aircraft while in the same period sale of only two Viscounts has been announced by Vickers.

• **Nonetheless,** it must not be forgotten that this spring Vickers stole an important customer from Convair-KLM Royal Dutch Airlines which, along with SABENA and Swissair, has been a veteran operator of Convair-Liners; KLM ordered nine Viscount 800s. Another pioneer Convair operator that has switched its orders to the British turboprop plane is Trans-Australia Airlines.

On the other hand, Continental Air Lines has still not taken up its 120-day option on 15 Viscount 800s which is due to expire this fall, and has converted its order for three additional Convair 340s to 440s; it has thus become the first U.S. airline to order the Metropolitan. Continental's decision on additional equipment is likely to hinge on the Civil Aeronautics Board's Denver case which may result in the carrier being given new routes to Chicago in the east and Los Angeles in the west.

The main advantage of the Metropolitan over the Viscount seems to be the American aircraft's economic superiority on short stages. SAS is going to use the aircraft mainly on its intra-Scandinavian routes where the average stage is 230 miles. On these services the airline considers it of paramount importance that the fares should be made as low as possible—hence operating economy is a key factor.

Because of rising traffic within Scandinavia (there has been a 77% increase in the last five years) SAS wanted an aircraft with a capacity greater than that of the DC-3 and the Saab Scandia

AUXILIARY JETS could be fitted to wingtips of the Convair 440 Metropolitan to boost its speed by 40 mph and to cut take-off runway length. Fairchild J44s or Continental J69s could be used for this installation. USAF is interested in equipping some military Convair-Liners with auxiliary jets.

Metropolitan Design Speeds

The following design and placard speeds are applicable to the gross weights of 48,000 and 49,100 lbs. for the Convair 440 Metropolitan:

	Design Speeds	Placard Speeds
Design level flight speed V_c	325 mph	.....
Design level flight speed V_c (demonstration)	300 mph	.....
Design gliding speed V_d	406 mph	366 mph
Design gliding speed V_d (demonstration)	375 mph	338 mph
Design speed (flaps full down)	170 mph	170 mph
Design speed (flaps ¾ down)	180 mph	180 mph
Design speed (flaps ½ down)	200 mph	200 mph
Design speed (landing gear extension)	200 mph	200 mph

Metropolitan Weight Analysis

The following weight statement is for a typical configuration of the Convair Model 440 Metropolitan with CB-16 engines (with CB-17s in parentheses):

Weight empty		31,000 lbs.
Useful load		2,040 lbs.
Pilots—2	330 lbs.	
Stewardess—1	130 lbs.	
Crew luggage and flight deck equipment	90 lbs.	
System fuel	53 lbs.	
System oil	213 lbs.	
Engine oil—60 gals.	450 lbs.	
ADI water—22 gal. at 7.46 lbs.	164 lbs.	
Passenger and ship service	610 lbs.	
Passenger compartment	90 lbs.	
Lavatory	70 lbs.	
Buffet—47 meals	450 lbs.	
Total fuel—1,064 gals. (1,247)		6,380 lbs. (7,480)
Payload—44 passengers and baggage at 195 lbs. each		8,580 lbs.
Take-off gross weight		48,000 lbs. (49,100)

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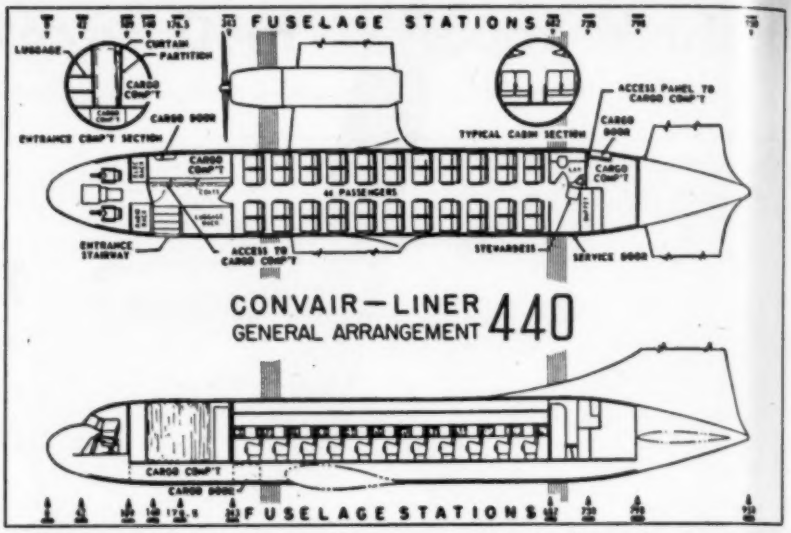
which currently operate intra-Scandinavian routes. It also wanted an aircraft which could be substituted for DC-6 on a short-haul flight if needed. The Metropolitan has the speed to do this. SAS estimates that the Metropolitan's cruising speed of almost 300 mph will enable the aircraft to make the Stockholm-Gothenburg flight, for instance, in 1 hr. 15 min, against the DC-3's two hours.

• **Top technical officials** of SAS had much to do with the choice of the Metropolitan. They were enthusiastic about the aircraft's powerplant, the Pratt & Whitney R-2800, which is used in the carrier's fleet of DC-6s and DC-6Bs. SAS technicians describe the R-2800 as one of the most reliable engines in existence. Since the SAS shops are already equipped to overhaul this powerplant there will be no additional costs for new equipment and tools such as there would have been with a switch to a British engine (turboprop or not).

Other features of the Metropolitan which appealed to SAS were the retractable door and stairway combination and the carry-on baggage facilities (something new to Europe: only Lufthansa's Convair 340s have this feature), enabling ground time to be cut.



METROPOLITAN CAN BE MADE a 52-passenger aircraft by installation of seats and related accommodations for eight additional passengers forward of the passenger compartment, shown above at Station 243.

• **Actually, the guaranteed** sound level range of the Metropolitan is as follows: First row of seats, 99-103 decibels for region "A" and 56-64 decibels for region "S"; Rear row of seats, 95-101 decibels for region "A" and 61-69 decibels for region "S". Region "A" level specified above is defined as the arithmetic average of the measured sound pressure levels expressed in decibels (.0002 dynes per square centimeter) in the two "octave" frequency bands, 20-75 and 75-150 cycles per second.

Region "S" level above is the arithmetical average of the measured sound pressure levels expressed in decibels in the three "octave frequency bands, 600-1,200, 1,200-2,400 and 2,400-4,800 cycles per second. The above sound levels are at the following flight conditions: 2,200 rpm left engine and 2,000 rpm right engine; 1,000 bhp per engine; 10,000 feet altitude; maximum differential, or sea level equivalent altitude, cabin pressure; front bulkhead door closed; and all eyeball vents open.

Another attractive feature of the Metropolitan, duplicated in the 340 but in few other piston-engine transports, is that, in the words of Convair: "With full regard to rapid advances of the art, the airplane is . . . designed to anticipate the installation of turboprop powerplants." This is no idle talk for the military YC-131C is already proving the aircraft's suitability for turboprop power while in England a 340 is about to fly with British turboprop engines. Whether it is the Convair 550 powered with Allison 501s (T56s) or Napier Elands or the piston-engined Convair 440 Metropolitan, one thing seems certain: For many years to come Convair will continue to be able to boast that "More airlines have chosen the Convair-Liner than any other modern passenger plane." • • •

Guaranteed Performances for Convair 440

The following Convair 440 performance is guaranteed with specific tolerances: cruising speed plus or minus, 3%; runway lengths plus or minus, 5%; altitudes plus or minus, 10%; range plus or minus, 3% (based on a SFC = 0.52 lb/bhp/hr).

Engine type	CB-16	CB-17
Maximum take-off weight	48,000 lbs.	49,100 lbs.
Average cruising air speed at 20,000 ft. (1,200 bhp/eng)* SFC = 0.52 lb/bhp/hr (demonstration weight 45,000 lbs.) shall be as follows:		
Cowl flaps closed and/or	289 mph	289 mph
Cylinder heads cooled to 200°C (cowl flaps as necessary)	283 mph	283 mph
Range, no wind, with 1,500 lbs. reserve, cruising operation with 1,200 bhp/eng* at 20,000 ft, SFC = 0.52 lb/bhp/hr (high blower)		
Take-off weight 48,000 lbs., fuel 1,113 gallons (in statute miles)	1,040	
Take-off weight 49,100 lbs., fuel 1,313 gallons (in statute miles)		1,300
Maximum CAR operating altitude with one engine inoperative, max. continuous power*, 45 000 lbs.		
Rate-of-climb = $0.02V_{so}^2$	9,500 ft.	9,500 ft.
Required CAR runway length:		
For take-off with 48,000 lbs. at sea level, 2400 bhp/eng*	4,930 ft.	
For take-off with 49,100 lbs. at sea level, 2,500 bhp/eng*		5,000 ft.
Required CAR runway length for landing at destination at sea level:		
At landing weight of 46,500 lbs. (reduced flap)	3,980 ft.	
At landing weight of 46,800 lbs. (reduced flap)		4,010 ft.
The following performance is estimated:		
Range, no wind, with 1,500 lb. reserve, cruising operation with 1,050 bhp/eng* at 20,000 ft., SFC = 0.505 lb/bhp/hr (high blower)		
Take-off weight 48,000 lbs., fuel 1,113 gallons (in statute miles)	1,150	
Take-off weight 49,100 lbs. fuel 1,313 gallons (in statute miles)		1,410

* *Torquemeter bhp/eng.*

Every pound of equipment weight saved is worth its weight in gold!

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E. H. HEINEMANN
Chief Engineer, El Segundo Division
Douglas Aircraft Company, Inc.

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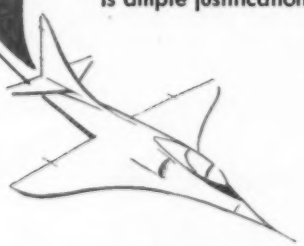
—E. H. HEINEMANN

at SAE National Aeronautic Meeting, Los Angeles



This growth factor discussed by Mr. Heinemann makes excess weight costly indeed. At $500 per pound, it literally costs its weight in gold. (Gold at $35 per troy ounce is worth $510.30 per avoirdupois pound.)

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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

St. Louis Builds Distinctive Terminal

Steady progress is being made in the construction of the $6.5-million Lambert-St. Louis Municipal Airport terminal building, which features a unique design that will make it one of the most distinctive airports in the U.S.

To create a great space where large flows of people could circulate with ease and at the same time allow for easy, graceful expansion, architects decided to cover the top passenger level with three dome-like shells.

Each shell rises 32 feet above the passenger-level floor and covers an area of 14,400 square feet. Together they encompass a space approximately 120 feet wide and 412 feet long. Daylight is diffused through skylights located between the shell forms.

• **The design plan** allows for the addition of three more shells which would double the presently planned space to be occupied by the terminal building. When and if the original size of the building is doubled, it is calculated, the saturation point of the airfield for planes will have been reached.

At the outset there will be 16 gate positions, on the finger system. In what is called the "matured" plan, these can be extended to 28 gates.

Present building plans call for three levels, with a top or passenger level at the same elevation as the parking approaches, a middle or finger level and a bottom or apron level.

• **The top level** will have a "Great Room" in which the ticket areas, waiting areas, concessions, dining and restaurant facilities are located. The restaurant and dining room, at one end, provide a view of outside activities.

• **The middle level** will carry passengers to and from planes by means of an escalator. Adjoining passenger concourses will be toilet facilities, a barber shop, postoffice, game area, nursery and Western Union office.

• **On the bottom level** will be a large catering kitchen, separate from the dining room and restaurant above, where menus for passengers of outgoing planes will be prepared. Here also will be the air mail, freight and cargo rooms.

The area between the terminal building and Natural Bridge Road, 550 feet away, will contain a landscaped park strip and parking space for 1,000 cars. Provision has been made for the future construction of a helicopter field, a cargo building and the parking of 1,700 additional cars.

Studies of air traffic and economics by the airport consulting firm of Landrum & Brown and the architects, Hellmuth, Yamasaki and Leinweber, preceded the formulation of design plans.

Airlines Studying Proposed Code For Serving Alcoholic Drinks

Domestic airline presidents are currently studying a proposed "code of practice" covering en route serving of alcoholic beverages.

Proposal was made by Harold L. Pearson, president of the Air Transport Association, following his receipt of a letter from the Civil Aeronautics Board concerning the liquor situation. Acting CAB Chairman Joseph P. Adams, emphasizing that the Board's sole interest in the matter is safety, asked the carriers through ATA to review their experience and advise the Board of any untoward instances which have occurred, and also to advise of any policy decisions which the industry may have reached.

Pearson asked the presidents to consider several points for possible inclusion in a code of practice and to give him their views in time for presentation of a code at the Air Traffic Conference meeting in San Francisco, Nov. 1-3. The points include:

• No person giving evidence of intoxication shall be permitted to board an aircraft. If such a condition becomes evident or offensive after departure, the person is to be removed at the first stop.

• No beverage service will be available to intoxicated persons or minors.

• No liquor service on Sundays or national election days.

• Service will be optional with any airline.

• Service will be confined to the hours between noon and midnight. No service on flights of less than two hours duration. No service on coach flights.

• No effort will be made to encourage by solicitation the consumption of alcoholic beverages. No commission payments to cabin attendants based on the sale of beverages.

• A normal charge will be made for drinks, either by sale per drink or by inclusion on extra fare flights with other luxury services.

• No advertising of the sale of drinks.

• Beverage service shall not be permitted to interfere with serving of meals or comfort of passengers.

• ATA should be empowered to police the industry code.

Adams noted in his letter to ATA that CAB has viewed the practice of serving drinks as being the responsibility of the airlines, with jurisdiction being left to individual states in the absence of any federal law. Rep. Thomas J. Lane, Massachusetts Democrat, has said he will seek a federal ban on serving liquor aloft.

In another letter to the Air Line Pilots Association, Adams repeated CAB's request of last year that the association submit anything tangible that would indicate that serving drinks endangers safety. ALPA and the Air Line Stewards and Stewardesses Association have passed resolutions opposing the practice.

First Interchange Flight

The first flight under the new National-Pan American-Panagra interchange agreement was made September 14, from New York to Washington, Miami and South American points.

Executive meeting "upstairs"

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AVIATION PRODUCTS

Airline Commentary

By Eric Bramley

Interesting fact: In an informal straw vote taken at a recent airline meeting, 21 out of 24 carriers favored putting the reconfirmation rule back into effect.

Domestic airlines seem to be flying off in all directions as regards a penalty plan for no-shows. Since eliminating reconfirmation, they've been unable to agree on any plan and have now named still another committee to look further into the matter. Meanwhile, they've knocked out the no-show charge on coach flights—it's no longer mandatory after October 2. There are sharp differences of opinion over the ground rules of a plan—ticket pickup times and conditions, etc. Carriers also have different ideas on whether a plan will be expensive to administer. Anyway, until everybody starts thinking along the same lines—and they aren't now—there'll be no plan. Our prediction is that early action isn't likely.

• •

What does it cost an airline to have an airplane out of service? United Air Lines gives us some idea, with the following eye-opening figures (based on last year's experience, including average operating revenue and depreciation less operating expense):

Plane	Revenue Loss Per Hour
DC-7	$543
DC-6, DC-6B	367
DC-4	157
Convair	112

• •

During a visit to Minneapolis we were chatting with Hal Carr, president of North Central Airlines, about the letters he receives from passengers regarding the airline's service. He says, gratefully, that most of the letters are now complimentary, but admits that he got his biggest chuckle out of a recent complaint. Wrote a passenger, succinctly: "The airplane is cold. The coffee is cold. The stewardess is cold. And you're not so hot yourself."

UAL and Hertz Propose New Fly-and-Drive Plan

United Air Lines and Hertz Rent A Car System have proposed a new promotional fly-and-drive plan to be tried for an experimental six-months period between nine pairs of points.

The tariff, filed by UAL with CAB for an October 1 effective date, names package reductions in total charges up to $6.90. UAL and Hertz said the plan was designed to "acquaint broader segments of the public with fly-drive convenience."

Reduced rates will apply only to first-class travel and to round-trips completed within 10 days. At the turnaround city, a Hertz car will be available for 12 hours and 50 miles of travel. Chicago-Cleveland fare, for example, will be $34 (compared with normal round-trip of $38) to which is added a special $8.50 car rate for a total package charge of $42.50.

Other pairs of points besides Chicago-Cleveland will be Chicago-Toledo, Cleveland-Toledo, Los Angeles-Oakland, Los Angeles-San Diego, Los Angeles-San Francisco, Oakland-San Diego, Portland-Seattle and San Diego-San Francisco.

Hertz announced that passengers who use a car in excess of the 12 hour-50 miles will be granted the "package discount" for additional use of the car.

Domestic Lines Drop Mandatory Penalty Rule

Domestic airlines have voted that after October 2 it will no longer be compulsory for a carrier to assess a no-show penalty on air coach passengers.

The present Air Traffic Conference rule states that unless a reservation has been canceled at least three hours prior to departure, 20% of the fare must be withheld from refund (minimum charge of $5). Decision to make the rule no longer mandatory was reached by majority vote of ATC, upon motion of TWA.

The rule became effective March 14, 1954, and was to be studied by airlines to determine whether it could be extended to first-class flights. At present, however, the industry is considering other no-show plans which would be applicable to both types of service.

A TWA official said the company had opposed the coach penalty from the outset but went along with it because it was to be experimental. However, he added, TWA asked ATC for its removal because (1) the penalty has not proved effective, and (2) it is discriminatory, inasmuch as there is no similar charge on first-class flights.

Sales, Traffic and Promotion

TWA has installed a "cash register" type machine at 20 airport ticket counters and two city ticket offices to handle excess baggage transactions. The machine, which provides a receipt showing date, amount collected for excess and register number, has speeded customer service by replacing the old system of hand-written receipts, **TWA** states. Accounting procedures are also simplified because the machine, produced by National Cash Register Co., retains a complete record of each transaction. . .

Braniff Airways says it expects to be the first airline to use an electronic reservations system on a systemwide basis. Teleregister Corp. is starting Braniff's installation immediately and expects the project to be completed by late 1956. . .

Southern Airways is sending its interline friends cards entitled "None of our friends go hungry down South." Present the card to any Southern sales representative along the route and he'll buy your breakfast (grits and red-eye gravy). . .

When **Continental Air Lines** started Denver-Kansas City coach service, Tom Dempsey, **CAL's** idea-a-minute interline and agency manager, sent 100-lb. sacks of potatoes to the ticket and reservations offices of connecting carriers. His message: "We would like to see as many eyes peeking out of the windows of our coaches as you will soon see peeking out of these potatoes". . .

A revised "currency converter" has been issued by **Pan American World Airways.** It converts dollars into local currency for 20 countries in Europe and the Middle East, translates distances, weights, volumes and temperatures from the metric system, and lists regulations for re-entry into the U.S. **PAA** has also issued a "Tips on Tipping Abroad" brochure, describing tipping customs in 15 European countries. Currency converter and brochure are available at ticket offices or from **PAA**, P. O. Box 1790, New York 17, N. Y. . .

Northwest Airlines has reduced the number of first-class seats on Super Constellation flights to the Far East from 19 to 11 and has introduced "slumber ease" seats to provide added comfort for first-class passengers. Tourist section of the mixed-accommodations planes is unchanged. NWA has increased Super Connie flights to the Orient to five weekly, three of which continue beyond Toyko to Manila. . .

United Air Lines now has self-claiming baggage areas in operation at 23 stations. Company finds that the do-it-yourself system is about 50% faster than the porter-fetching method.

Airlines Report Top Executives Salaries

The following carriers have filed with CAB Schedule E reports listing the 1954 salaries, other compensation, and stockholdings of officers and directors:

• **Aerovias Sud Americana, Inc.**—V. V. Carmichael, Jr., pres., $10,200 salary, $250 bonus and indirect compensation; Paul E. Dixon, v.p., $10,200 salary, $250 bonus and indir.; C. Booker Powell, v.p., $6,000 salary (up $6,000), no bonus and indir.; R. C. Minor, v.p., $6,100 salary (up $700), no bonus and indir.; Henry C. Palmer, secy., $6,400 salary (up $100), no bonus and indir.; J. D. Rains, treas., $10,200 salary, $250 bonus and indir.

• **Byers Airways, Inc.**—Robert D. Byers, pres., $14,400 salary (up $400), $100 bonus and indirect compensation; Gladys Byers, v.p., $2,300 salary (up $100), $100 bonus and indir.; Mildred Bettisworth, secy. and treas., $7,525 salary (up $700), $100 bonus and indir.; Frank Jones, asst. secy., $8,200 salary (entered office June 1, 1954), $100 bonus and indir.

• **Caribbean-Atlantic Airlines, Inc.**—Dionisio Trigo, pres., $16,500 salary (up $1,500); Benigno Trigo, v.p., $6,500 salary (up $500); Jose M. Sierra, v.p. operations, $13,000 salary (up $1,500); L. A. Lockhart, treas., $8,600 salary (up $500); Adolfo Valdes, secy., no salary; Henry G. Molina, asst. secy., no salary.

• **Northeast Airlines, Inc.**—Paul F. Collins, chairman of board, no salary, no bonus and indirect compensation; George E. Gardner, pres. and dir., $25,000 salary, $5,000 bonus and indir.; A. A. Lane, v.p. operations, $15,000 salary $1,500 bonus and indir.; R. L. Turner, v.p. traffic and sales, $15,000 salary, $3,000 bonus and indir.; D. W. H. MacKinnon, v.p. engrg. and maintenance, $12,000 salary (up $11,261.60), $1,000 bonus and indir.; Hamilton Heard, treas., $15,000 salary, $1,500 bonus and indir.; G. E. Reed, asst. treas., $1,087.50 salary (entered office November, 1954), $250 bonus and indir.; H. E. Foley, clerk, no salary, no bonus and indir.

• **Northern Consolidated Airlines, Inc.**—Raymond I. Peterson, pres. and dir., $18,000 salary; R. J. Stevenson, v.p. and dir., $8,873.12 salary (down $6,182.41); Victor R. Davis, secy. and dir., $9,600 salary; Marie A. Peterson, asst. secy., $1,800 salary; S. B. Fitzhugh, treas., $13,875 salary (up $1,375), John Walatka, dir., $11,826 salary (down $3,800.50).

• **Northwest Airlines, Inc.**—Harold R. Harris, pres. and chief exec. officer, $31,667 salary (down $18,333) (resigned March 4, 1954); Donald W. Nyrop, pres. and chief exec. officer, $13,578 salary (entered office Sept. 27, 1954); Malcolm S. Mackay, exec. v.p., $29,263 salary (up $1,347) (entered office Feb. 23, 1954); Frank C. Judd, v.p. operations, $25,000 salary; James W. Mariner, v.p. sales, $18,000 salary (up $1,825); Willis Player, v.p. public relations, $10,500 salary (down $1,500); L. C. Glotzbach, v.p. personnel, $22,000 salary (up $1,000); Lawrence B. Kinports, v.p. orient region, $17,039 salary (entered office Feb. 23, 1954); A. E. Floan, v.p. and sec., $21,000 salary (up $1,000); L. S. Holstad, comptroller, $19,705 salary (up $1,705) (entered office Feb. 23, 1954); William J. Elden, treas., $19,394 salary (up $3,794) (entered office Feb. 23, 1954); A. D. Piepgras, asst. comptroller, $12,000 salary (entered office Mar. 4, 1954); D. H. Hardesty, asst. treas., $9,980 salary (entered office Mar. 4, 1954); Frank J. Scott, asst. secy., $9,600 salary (up $3,675); Dale Merrick, asst. v.p. properties, $13,000 salary (up $5,294); C. L. Stewart, asst. v.p. plans, $11,000 salary (up $1,837); Croll Hunter, chrm. of bd., $50,000 salary.

• **Riddle Airlines, Inc.**—John Paul Riddle, pres. and dir., $9,269 salary (entered office as pres. August 2, 1954 and dir. as of May 25, 1954); Peter T. Craven, secy. and treas., $8,199 salary (entered office March 6, 1954); Charles L. Hood, v.p. sales, $9,000 salary; Harry T. Weaver, regional v.p. New York, $7,800 salary (entered office June 12, 1954); William B. Thompson, Jr., regional v.p. Wash., $500 salary (entered office June 12, 1954); Orlando Torres, regional v.p. Puerto Rico, $9,600 salary (entered office June 12, 1954); Jane B. Ramsey, asst. sec., $4,100 salary (up $200); Philip A. Mann, dir., $8,042 salary (down $958).

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CAB NEWS

Recent Decisions

Frontier Airlines directed to show cause why 28 of its certificated points should not be made permanent and the remaining 12 renewed on a three-year trial basis.

Northwest Airlines authorized to serve Chicago through O'Hare Airport as an alternate to Midway Airport, beginning about October 30, but dual use of both fields for the same flights prohibited.

Applications

Western Air Lines applied to CAB for consolidation of its Routes 13 and 35 into a single route to be designated No. 13.

National Airlines, which is challenging future steps in the Eastern-Colonial Case in Court, asked CAB to turn down the merger agreement because the price EAL proposes to pay for Colonial is "exorbitant and outrageous."

Pacific Northern Airlines has asked CAB approval of a 23% cut in fares from Ketchikan to Seattle/Portland, Anchorage and Cordova, effective Oct. 15.

Calendar

Sept. 26—Hearing, Reopened Delta-C&S Mail Rate Case (International). Wash., D. C. Docket 2564.

Sept 28—Argument, Commercial Charter Case (ACTA and IMATA). Wash., D. C. Docket 6580.

Sept. 29—Hearing, Erie-Detroit Service Case. Erie, Pa. Docket 6927 et al.

Oct. 3—Hearing, U.S. Overseas Airlines Enforcement Case. Wash., D. C. Docket 7006.

Oct. 3—Hearing, New York-Nassau Case. Tentative. Docket 7002 et al.

Oct. 5—Hearing resumed, Large Irregular Air Carrier Investigation. Wash., D. C. Docket 5132 et al.

Pending Cases

Although a prehearing conference was held recently in the newly-instituted **Florida-Texas Investigation**, indications are the case may soon be dropped since Eastern and National are reportedly close to an interchange agreement, the absence of which inspired the investigation in the first place.

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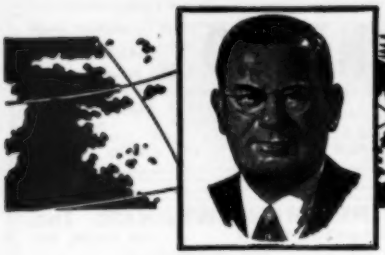

EN ROUTE . . .

WAYNE W. PARRISH

Four New Stops and Five New Honors

As I've said before, this hobby of mine to visit every airline stop in the country is producing some unusual results. I ticked off four new stops on Central Airlines recently and ended up with being made an Arkansas Traveler, an honorary citizen of three towns, and was given a big key to another.

En route to Los Angeles, I took American's #117, a DC-6B, to Little Rock, Arkansas, where I was being met by Keith Kahle, Centrals' ebullient president. This DC-6B flight was one of those which a lot of wise guys in the industry ten years ago said was impossible, that is, using one of the biggest airplanes on the system for intermediate stops such as Nashville, Memphis and Little Rock. The plane was jam-packed (just to prove the wise guys wrong) and had a couple of efficient, pleasant stewardesses (Misses Summers and Trappe) who performed a miracle by serving dinner to a full load in the 45-minute hop from Nashville to Memphis. Not only did they do it without undue haste, but with smiles.

On arrival Kahle took me to the fine suburban home of State Senator Ellis Fagan, a power in those parts, for an excellent charcoal steak dinner in the back yard. On hand was Bill Berry, one of CAA's best-loved old-timers who resigned several years ago and is now a member of the Arkansas Public Utilities Commission and looks for all the world like he'd always been a commissioner. Upshot of the evening was that Senator Fagan, on behalf of Governor Orval Faubus, made me an Arkansas Traveler and handed me a big certificate to prove that it's so. That's a mighty fine honor, neighbors, and I'm proud as punch.

Next morning at the Marion Hotel I had fried mush and syrup for breakfast, a midwestern delicacy I don't get much of these days. Like grits in the deep south, mush is made of white corn meal but it's ground up much finer, and hence is much better in my opinion. (Those southerners just got tired grindin' so they eat those lumpy grits). If you've never had fried mush right off the stove with good syrup, man, you've missed a lot.

At the airport there was a ceremony, the first of many as I found out later. This time A. E. Runnels, of the Little Rock Chamber of Commerce, presented a certificate declaring that Mayor Pratt Rennell had made me an honorary citizen. Thanks, mayor, I accept. Radio station KVLC interviewed me and so did a newspaper and after a bunch of photographs, Central's station manager Chester Nantz finally got old #52 dispatched westbound.

First stop was Hot Springs, which I hadn't seen since about 1925. It's a beautiful and bustling area now, with a fine airport on top of a leveled hill. Mayor Floyd Housley was on hand to make me an honorary citizen of Hot Springs National Park, certificate included. Helping out were Clay Harriston, president, and Mort Cox, manager, of the active Chamber of Commerce. Ralph Disheroon, airport manager, and Bob Aldie of Central were in the group, and an unexpected pleasure was having some visiting beauty queens board #52 on their way home.

Next stop was Fort Smith, another new one for me, by way of the green and attractive Ozark country. A big delegation headed by Mayor H. R. Hestand was awaiting. I was made honorary citizen again, and interviewed by KFPW and the local newspaper. In the group were J. W. Slates, manager of the Chamber of Commerce; City Commissioners Hugh Brewer and Charles Mankin; Sheriff Prentice Maddux; C. C. Davis, chairman of the airport advisory board; Bob Crisp, the airport manager whom I've met at AAAE meetings; Paul Jones and Al Nagy of Central, and others.

Then came Fayetteville, home of the University of Arkansas and Swanson frozen foods. Mayor Roy Scott and Wesley Gordon of the Chamber of Commerce were on hand with a good-looking gal to present Kahle and me with two plates of positively delicious fried chicken, still warm from the frying pan. We also got two complete frozen dinners. There was an interview with KGRH and some picture-taking, and off we went to Muskogee with Kahle and I eating every scrap of that fried chicken.

At Muskogee, Oklahoma, City Manager Clay Harrell presented a big key to the city to me. The delegation of businessmen, which included Bill McCauley of the Chamber of Commerce, was too numerous to mention here. Central's men were W. D. Farnsworth and A. D. Hutchinson. Our stop was brief as by this time Central was operating somewhat behind schedule, and we headed for McAlester, Okla., the only place where there was no ceremony, and on to Dallas and Fort Worth where I rested up from campaigning for honorary citizenships and later took an American DC-6B to Phoenix. My firm conclusion is that Central's Kahle is the promotin'st guy in the airline business.

Honorary citizenship at Hot Springs. L. to r., Mayor Floyd Housley, WWP, Clay Harriston, pres. of Chamber of Commerce; and Kahle. On steps, Miss Texas of 1954, Miss Oklahoma of 1954, and Stewardess Collins.

Ceremony at Little Rock. Left to right: A. F. Runnels, of the Little Rock Chamber of Commerce; Mary Frances Collins, Central's comely stewardess; Keith Kahle, Central's promotin' president, and WWP.

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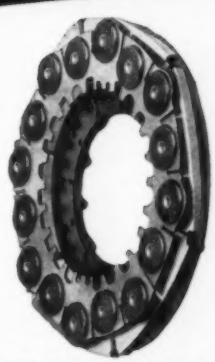

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